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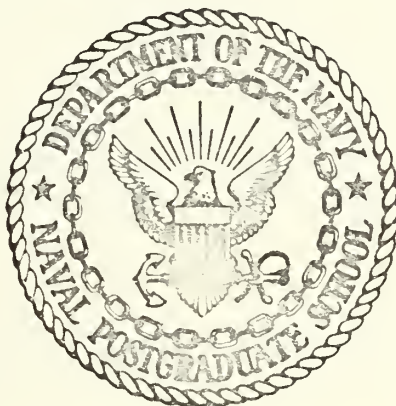
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A COMPUTER SIMULATION FOR THE EVALUATION
OF ARTILLERY DIRECT FIRE SUPPORT SYSTEMS

Lowell Lee Martin

United States Naval Postgraduate School



THESIS

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OF ARTILLERY DIRECT FIRE SUPPORT SYSTEMS

by

Lowell Lee Martin

September 1970

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1140076

A Computer Simulation for the Evaluation
of Artillery Direct Fire Support Systems

by

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Major, United States Army
B.S., United States Naval Academy, 1961

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

from the

NAVAL POSTGRADUATE SCHOOL
September 1970

ABSTRACT

A probabilistic event store computer simulation of the artillery direct fire support system at brigade level is presented. The purpose of the model is to serve as a tool in evaluating changes in artillery fire support system effectiveness as system and battlefield parameters are varied. Parameters which are variable in the model pertain to the geometric configuration of the battlefield, artillery weapon employment configurations, artillery weapon ballistic parameters, weapon lethality, target configuration and vulnerability, artillery system time parameters, weapon position accuracy parameters, and target location accuracy parameters. A description of the model and a FORTRAN IV program listing are provided.

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I. INTRODUCTION

Current doctrine holds that the mission of the Army Field Artillery is

"...to provide continuous and timely fire support to the force commander by destroying or neutralizing those targets that jeopardize the accomplishment of his mission".

In order to accomplish its mission the field artillery is required to support the maneuver forces with timely, close, and accurate fires on hostile maneuver elements, deliver counterbattery fires throughout its zone of responsibility, and add depth to combat by delivering fires on hostile logistical installations, reserves, etc..

In combat the field artillery operates as an integral part of the overall fire support system. Within the fire support system all fire support means are coordinated and integrated so that hostile targets are adequately attacked by appropriate means or available weapons. The field artillery fire support system thus operates as a subsystem of the larger overall force fire support system.

The field artillery fire support system can be viewed as consisting of three basic subsystems each with basic functions as described below.

(1) Weapon Subsystem: This subsystem consists of the actual artillery weapons, personnel, and auxiliary equipment. The function of the weapon subsystem is to prepare and fire projectiles in accordance with specific fire commands provided it.

(2) Target Acquisition Subsystem: This subsystem in its simplest form consists of a forward observer team. In more advanced systems this forward observer may be augmented by aerial observers, aerial reconnaissance, and radar. The function of the target acquisition subsystem is twofold. This subsystem has the responsibility for locating and identifying suitable targets for artillery fire. Secondly, in the case of the forward observer, the effects of artillery fire on the hostile targets are observed. Adjustments are made to the impact points in order to achieve the best possible results.

(3) Command and Control Subsystem: The command and control subsystem consists of all elements necessary to coordinate and direct the actions of the other two subsystems. The function of this subsystem is basically to provide the necessary coordination and direction necessary for the proper utilization of these systems. The artillery fire support system command and control system is closely associated with the command and control system of the supported force.

The effectiveness with which an artillery fire support system accomplishes its mission must by definition be evaluated in terms of speed, accuracy, and damage or casualty producing effect that the artillery fire support system achieves against hostile targets in specific situations.

The effectiveness with which the overall system operates is a function of the effectiveness of the component subsystems. In each

of these subsystems, errors are introduced and time is consumed during the fire support process. In conducting a quantitative analytical evaluation of a specific system, one quickly encounters formidable mathematical obstacles. Broad generalizations are sometimes achievable; however, these seldom are of much operational value. Some typical questions which might be asked concerning a fire support system and for which a quantitative answer might be useful are:

(1) Suppose weapon System A is replaced by weapon system B which has greater lethality. What increases in kill rate can be anticipated?

(2) Suppose the current weapon employment configurations are modified. Will this modification yield any appreciable change in kill rate or some other suitably chosen measure of effectiveness?

(3) How is some suitably chosen measure of effectiveness related to width of the battle front, or movement rate of the supported force?

Questions such as those posed above can be extremely basic and important questions when artillery fire support system modifications are being considered or evaluated.

The purpose of this paper is to present a computer simulation model which may be of some assistance in answering questions such as those posed above. As a means of limiting the scope, the brigade level artillery fire support system was selected for modelling. The brigade is assumed to be conducting offensive operations.

II. THE BRIGADE LEVEL ARTILLERY FIRE SUPPORT SYSTEM

At maneuver brigade level artillery fire support is normally provided by an artillery battalion consisting of three firing batteries. This section describes the brigade level artillery fire support system in terms of the basic subsystems identified in Section I.

A. WEAPONS SUBSYSTEM

The weapons subsystem normally consists of three firing batteries each conventionally with six artillery weapons. The weapons are employed in battery size elements. The batteries are located in the offense behind the front line a distance approximately equal to $1/3$ the maximum range of the weapon. The units are located laterally as the situation dictates in such a manner as to provide the best possible coverage for the entire brigade front.

B. TARGET ACQUISITION SUBSYSTEM

At brigade level the target acquisition system normally consists of the forward observer sections, the battalion liaison officers, and the battalion countermortar section when available.

Each of the committed maneuver companies in the brigade is provided an artillery forward observer. The mission of the forward observer is threefold. First, the forward observer provides advice and recommendations concerning the use of artillery to the company commander. Secondly, the forward observer serves as a fire support

assistant to the company commander. Thirdly, the forward observer adjusts the artillery when necessary to increase the effectiveness of the fire. The forward observer, being located with the maneuver element company commander, maintains an awareness for the availability of suitable targets for artillery fire.

An artillery liaison officer is provided each of the maneuver battalions in the brigade. The LNO serves as the fire support coordinator for the maneuver battalion. In this capacity, the LNO also maintains a current awareness of the availability of suitable targets for artillery. The LNO maintains his duty station in the battalion operations center and thus is constantly aware of the current intelligence and operational situations.

C. COMMAND AND CONTROL SUBSYSTEMS

The command and control subsystem consists of a Fire Direction Center and a Fire Support Coordination Center. The functions of each of these centers is described below.

1. Fire Support Coordination Center

The Fire Support Coordination Center is collocated with the brigade operations center and serves as the focal point for the coordination of all supporting fires delivered on surface targets. The goal of proper fire support coordination is the complete coordinated integration of all fire support means in an effort to ensure that each target is attacked in the most efficient manner.

The commander of the artillery battalion has responsibility for fire support coordination for the brigade; he thus has responsibility

for the operation of the brigade Fire Support Coordination Center. His representative at the FSC is the artillery battalion liaison officer.

2. Fire Direction Center

The Fire Direction Center (FDC) is that element which exercises tactical and technical fire direction of the battalion. Tactical fire direction consists primarily of selecting unit position areas and selecting the method of attack for targets being engaged. Technical fire direction, on the other hand, consists of the conversion of target location information and the results of the tactical fire direction decisions into suitable firing data for the weapons.

The coordination and integration of the fire support means are carried out in these two centers.

D. THE FIREPLANNING PROCESS

In order to properly coordinate fire support, it is necessary that the need for fire support be anticipated when possible. The artillery fireplanning process is the process whereby the need for artillery is anticipated and the use of available resources is planned. Artillery fireplanning is a continuing process and is conducted at all levels concurrently.

At the lowest level, the forward observer prepares target lists and forwards them to the liaison officer at maneuver battalion. The LNO consolidates the lists and coordinates them where necessary, then forwards them to the artillery fire direction center. The

artillery battalion S3, in the FDC, receives the target lists and other requests for fire and coordinates the allocation of the available artillery resources to satisfy the various requirements for artillery fire.

E. TYPES OF TARGETS

Two basic classification systems are used for artillery targets. Targets are first classified according to the characteristics of the target itself. Under this system the target can be classified as either personnel, material, or a piece of terrain which warrants engagement by fire.

Secondly, targets are classified as either being planned or unplanned. A planned target is a target which appears on one of the target lists described in the previous paragraph. A target of opportunity, or unplanned target, is a target which is observed or detected after an operation begins. Such a target has not been previously considered, analyzed, or planned and fire is frequently required immediately.

The planned targets can be further subcategorized into scheduled and on-call targets. The distinction between the two is clear from the following definitions:

(1) Scheduled Target. A target upon which fire is to be delivered at a specific time during an operation.

(2) On-Call Target. A planned target, other than a scheduled target, for which a need is anticipated but which will be fired on request rather than at a specific time.

F. OFFENSIVE SUPPORTING FIRE

When participating in the fireplanning process, those conducting fireplanning are guided by basic supporting fire requirements.

There are three basic supporting fire requirements, namely: offense, defense, and a combination of the two. Since this model portrays the brigade in the offense, only the offense support requirements are considered.

Supporting fire, in general, is fire delivered by supporting units to assist a unit engaged in combat. When the supported unit is engaged in the offense, fires are planned to engage targets before the preparation phase, during the preparation phase, and during the attack. These different types of fires are each briefly described below:

1. Fires Before the Preparation Phase

Fires fired before a preparation phase normally consist of fire to cover the deployment and movement of troops, registration fire, and harrassing and interdiction fire to restrict the enemy's movement and disrupt his command and control.

2. Fires During the Preparation Phase

Preparation fire is intense prearranged fire delivered in accordance with a time schedule to support an attack and is designed to disrupt the enemy's communications, to disorganize his defenses, and to neutralize his fire support means. Preparation fire starts before, at, or after H-hour and continues until it is lifted, either on a prearranged time schedule or on request of the assault elements.

3. Fires During the Attack

Fires during the attack are those fires delivered to assist the advance of the supported unit. They consist of fires between the line of departure and the objective, fires on the objective, and fires beyond the objective.

Targets generated in the fireplanning process generally include confirmed enemy locations, suspect enemy locations, likely enemy locations, and also prominent terrain features.

III. THE COMPUTER SIMULATION MODEL

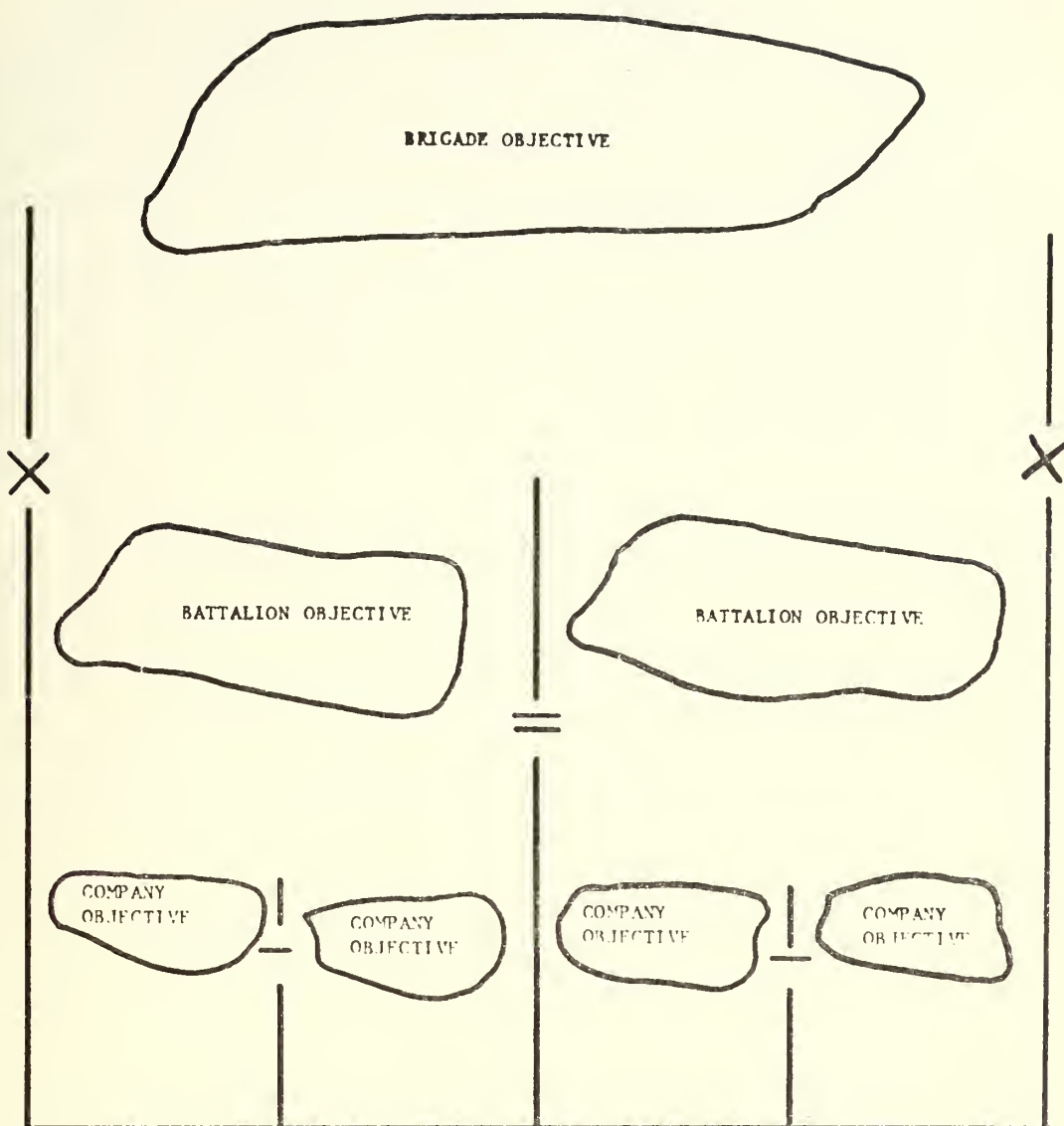
The computer simulation model is a computer representation of a brigade level offensive combat operation. Portrayed in the model are a maneuver brigade supported by a direct support artillery battalion. This section provides a description of the model.

A. SCENARIO

The battle area for the model is defined by the brigade left and right boundaries, the brigade rear area, and the brigade objective. The brigade area of responsibility is subdivided into two battalion areas of responsibility which are themselves each subdivided into two company areas of responsibility. The model thus portrays a brigade operating with a four company front. The brigade battle area is illustrated in Figure 1.

The brigade is supported by a direct support artillery battalion consisting of three batteries of six weapons each. In addition to the direct support battalion, it is assumed that additional artillery battalions are available which are capable of augmenting the fires of the direct support battalion where necessary. These additional supporting battalions play no direct role in the simulation; however, their existence is necessary to assure an orderly progression during the computer simulation.

The terrain is assumed to be flat and weather is considered to be conducive to unobstructed operations. Effects of changes in terrain and weather are not considered in the simulation.



X - Brigade Lateral Boundaries
 II - Battalion Lateral Boundaries
 I - Company Lateral Boundaries

THE BATTLE AREA

FIGURE 1

There is no friendly attrition or resupply played during the course of the simulation. Units are considered to be free of any logistical constraints. In this regard, it is assumed that sufficient maneuver element personnel replacements exist to sustain the offensive once the attack begins. It is also the case that artillery units have sufficient ammunition immediately available to carry out any and all fire missions as the requirements for fire are generated.

The initial phase of the simulation is a setup phase during which the initial situation is stochastically generated. Force objectives are described for each maneuver unit as are the unit lateral boundaries. Unit objectives are described by stochastically determining four basic objective characteristics for each objective, namely:

- (1) distance from the front line to the objective
- (2) length of the major axis
- (3) length of the minor axis
- (4) objective attitude

Using these four characteristics, an objective for each unit is defined and positioned. Figure 2 illustrates the characteristics of the objective.

After the unit objectives and lateral boundaries are specified and initial artillery fire plan is generated, the artillery batteries are positioned to support the fire plan. The battle is initiated by the firing of an artillery preparation in support of the attack on the unit initial objectives if one is called for by the fire plan.

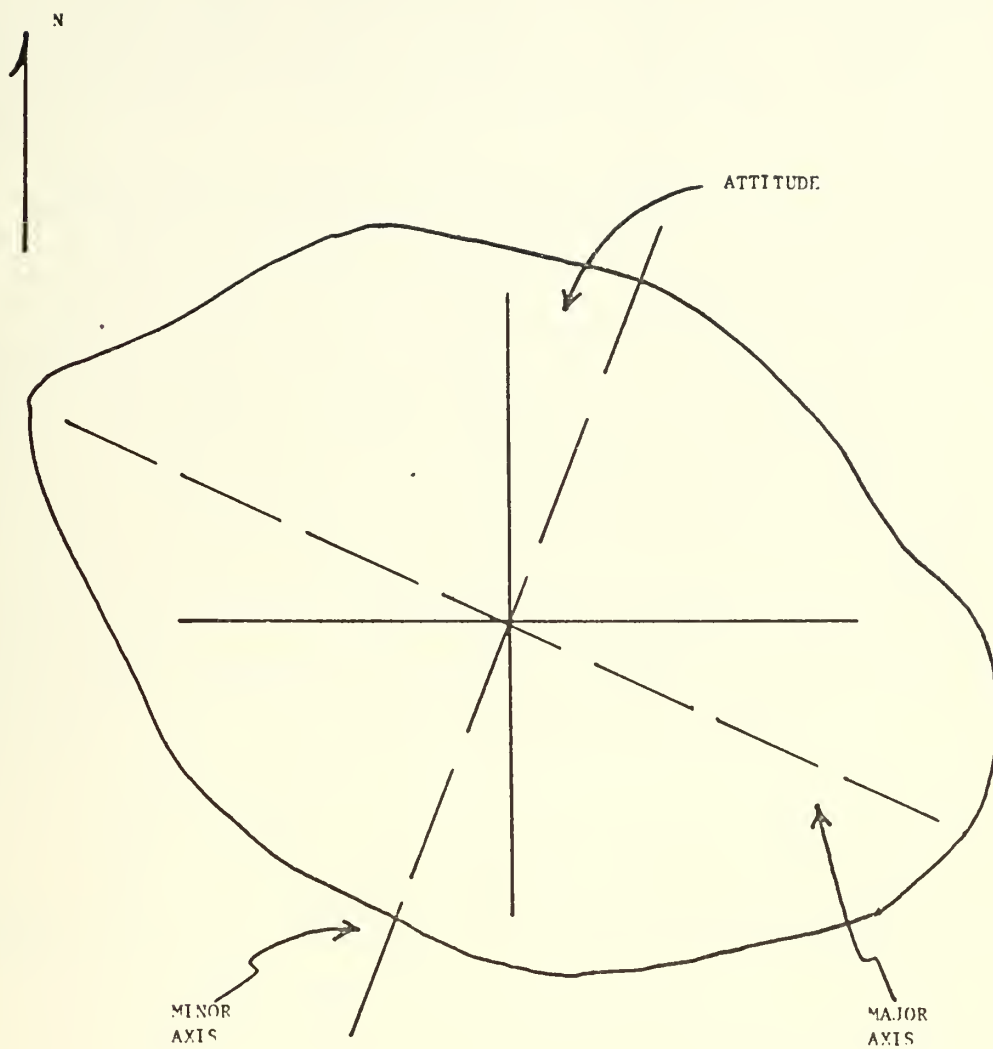


DIAGRAM OF A UNIT OBJECTIVE

FIGURE 2

The enemy force is simulated by randomly introducing targets upon which artillery fire is required. Targets are independent of one another and no starting enemy force disposition is assumed.

B. CONTROL AND MOVEMENT OF MANEUVER ELEMENTS

Control of the maneuver elements is affected by the assignment of subsequent unit objectives as the need arises and the use of control states and coordinated attack times for interunit coordination purposes. Unit locations are represented in the model geometrically by a single geometric point. This point is called the unit "Fire Planning Center (FPC)". A unit FPC corresponds to the geometric center of the dispositions of a unit's forward elements along the front line. Units are moved by moving the unit FPC.

1. Control States

Nine separate numbered control states for maneuver element control are used in the model. A description of each is as follows:

a. Control State 1

This state represents the planning state for the maneuver elements. While in this state fireplanning is conducted. Each unit is initially in this state and the state is re-entered each time a unit objective is secured. The simulated unit remains in this state until the pre-generated attack time for the next maneuver phase is reached.

b. Control State 2

State 2 represents the movement from the unit line of departure (LOD) to a transfer grid at which final closure onto the

objective may begin. The relative location of the transfer grid from the unit objective is a function of the distance from the line of departure for the unit to the objective center. The transfer point is prespecified as being located $2/3$ of the distance between the line of departure and the unit objective center. When a unit crosses the transfer grid, it passes to state 3 for control.

c. Control State 3

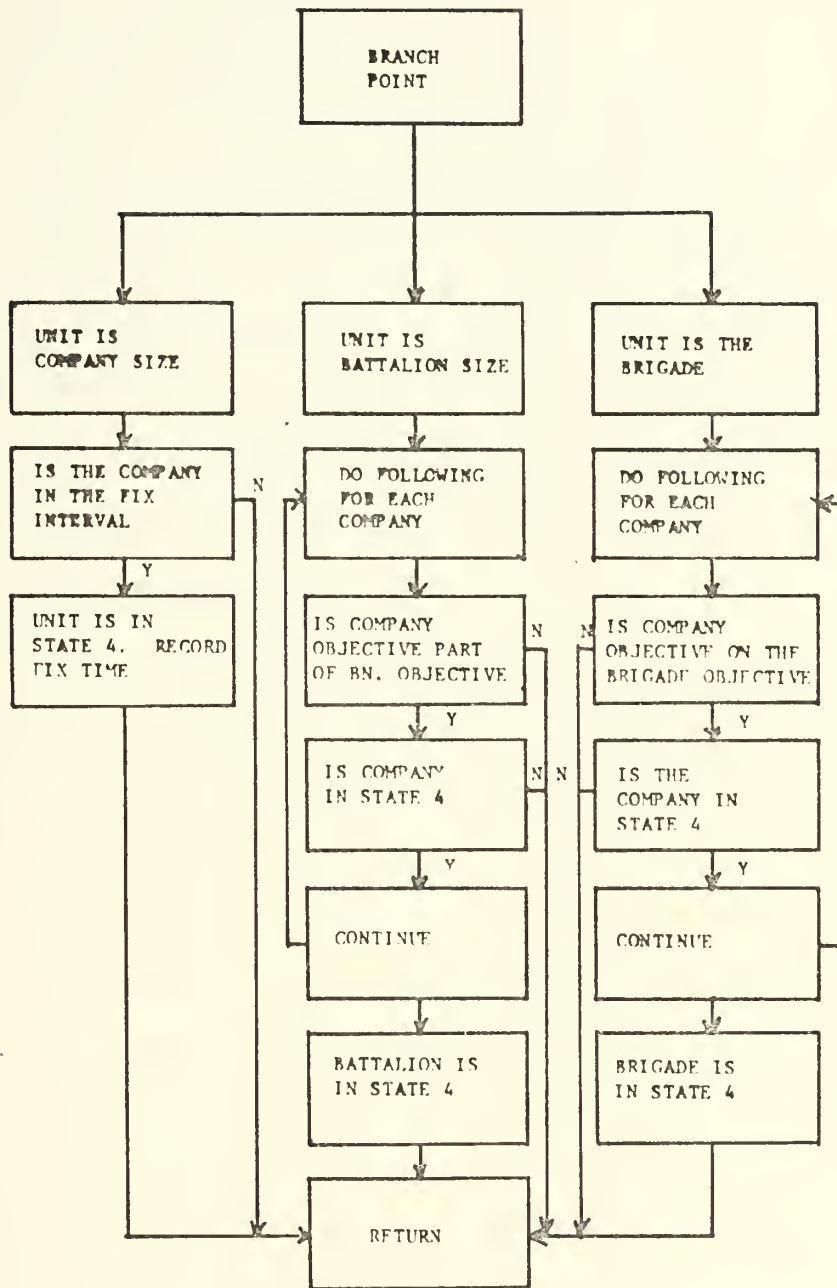
Closure onto the objective takes place while the unit is in control state 3. This state represents the unit movement from assault positions to the objective. While in state 3 the unit FPC is moved incrementally along a path leading directly to the objective center.

d. Control State 4

This state simulates the actions of the unit on and near the objective up until the time the objective becomes secure. A company size unit enters state 4 when it reaches a point less than 200 meters short of its objective center or a point on the far side of its objective center (indicating that the unit has fought through the objective). The logic controlling the assignment of state 4 to units larger than company is depicted in Figure 3.

e. Control State 5

A unit enters state 5 for control purposes when its objective has been secured and the unit objective is not located on the brigade objective. This state is intended to simulate the reorganization and control which takes place once an objective is



LOGIC FOR CONTROL STATE 4

FIGURE 3

secure. The program logic involved in the assignment of this control state is shown in Figure 4.

f. Control State 6

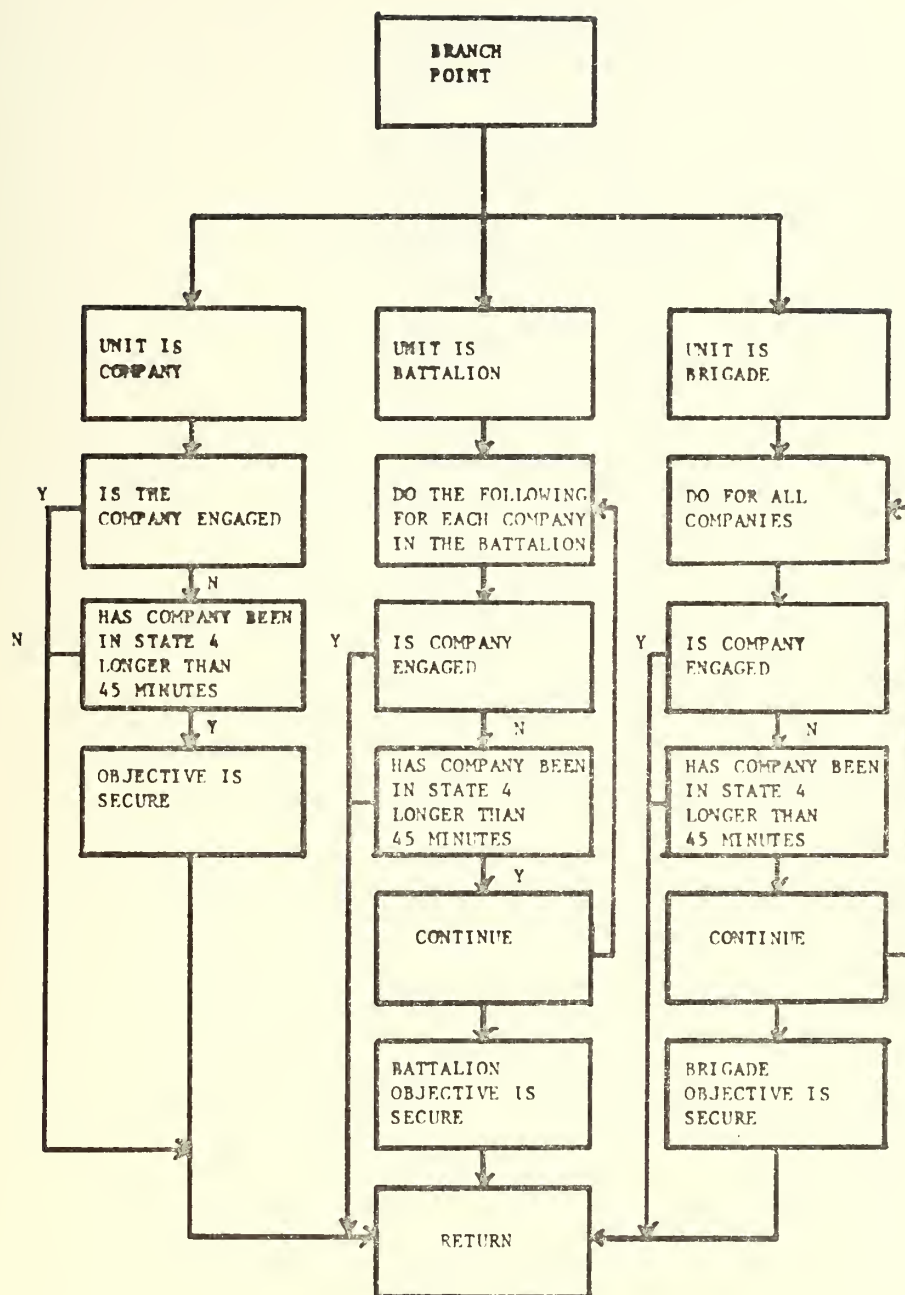
Control in this state pertains to freedom of movement. During the progression of the simulation, a unit FPC is never allowed to advance when it is ahead of its sister unit by more than a specified separation distance. The distance used is $1/5$ the distance from the unit line of departure to the objective center. When a unit enters this state, movement becomes restricted. The algorithm controlling unit movement is shown in Figure 8.

g. Control States 7, 8, 9

Once a unit enters state 5, it becomes eligible for the assignment of a subsequent objective. The subsequent objective can be either independent of the next higher objective or can be a portion of this objective. The assignment rules for new objectives are illustrated in Figure 5 and Figure 6. A unit is placed in control state 7 if, when the new objective is generated, the objective is found to be independent of the next higher unit objective. Control state 8 is assigned if this is not the case. Control state 9 is assigned if the next objective is the unit's final objective for the simulation. The nine control states are interrelated as shown in Figure 7.

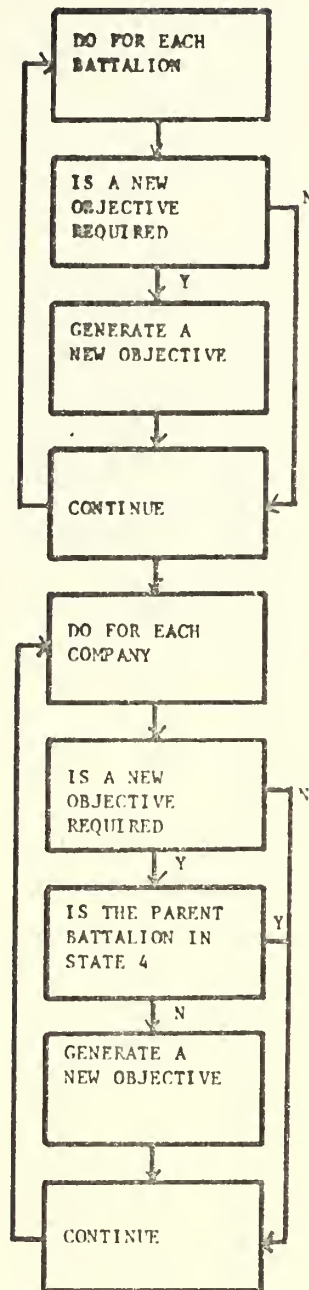
2. Attack Coordination

After a unit objective is secure and a new objective is assigned, a new attack time is established which coordinates the



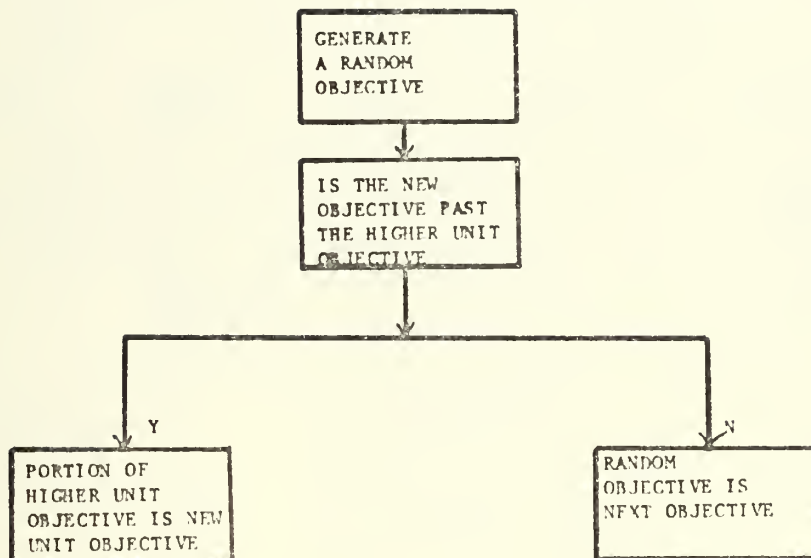
LOGIC FOR CONTROL STATE 5

FIGURE 4



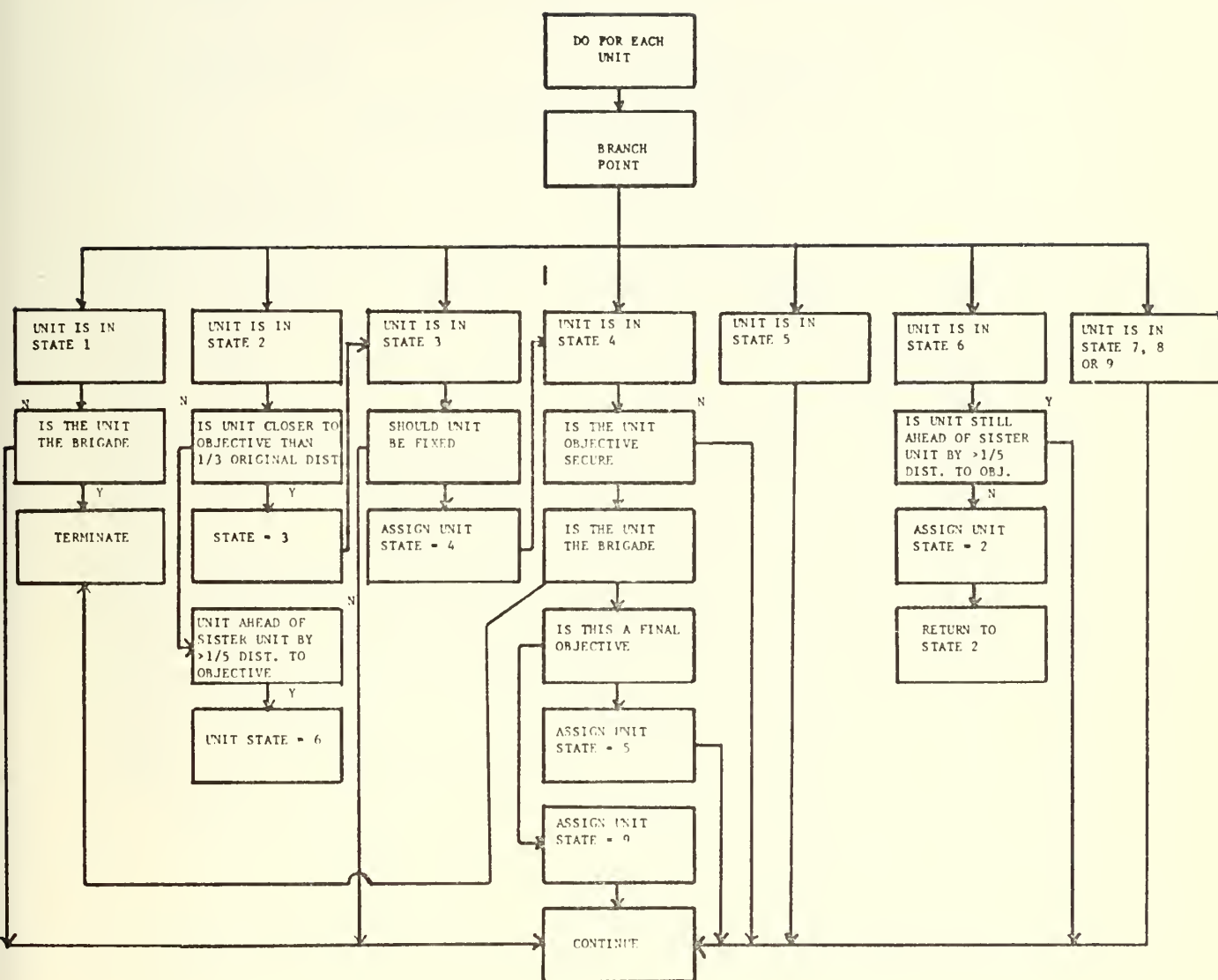
LOGIC FOR ASSIGNMENT OF NEW OBJECTIVES

FIGURE 5



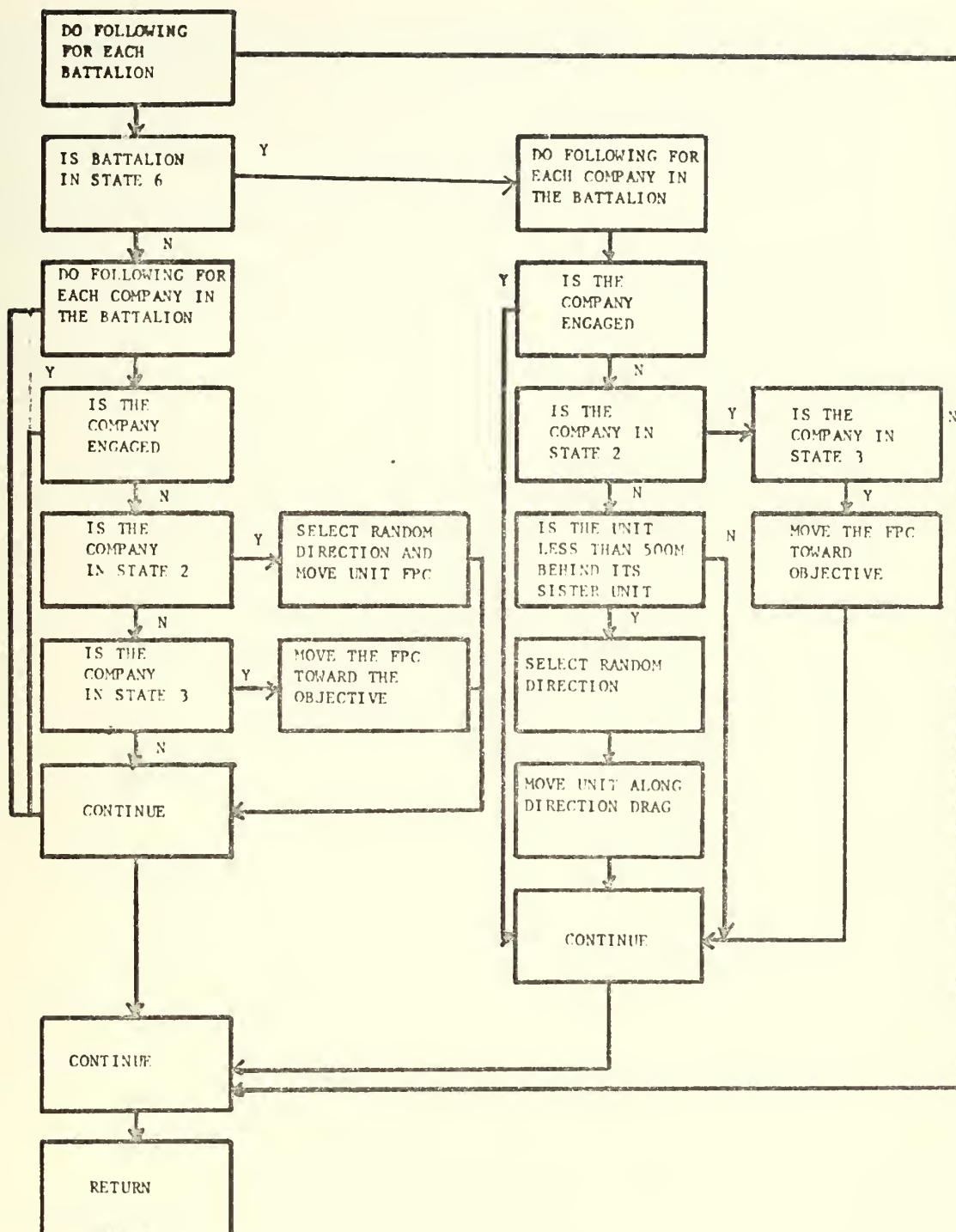
GENERATION OF NEW UNIT OBJECTIVE

FIGURE 6



INTERRELATIONSHIP OF THE CONTROL STATES

FIGURE 7



UNIT MOVEMENT LOGIC

FIGURE 8

unit movement with that of the remaining units. Two or more units are assigned identical attack times in the following situations:

- a. Two companies of the same battalion have new objectives on the battalion objective.
- b. Attack is initiated on a new battalion objective.
- c. Both battalions have new objectives on the brigade objective.

In addition to having identical attack times assigned in the situations described above, fireplanning is coordinated as depicted in Figure 9.

3. Unit Movement

Company size units are moved by moving their respective fire planning centers. Movement of the battalions and the brigade is then reflected by the resulting displacement of their FPC's. Decision rules used to govern unit movement are shown in Figure 8.

4. The Update Sequence

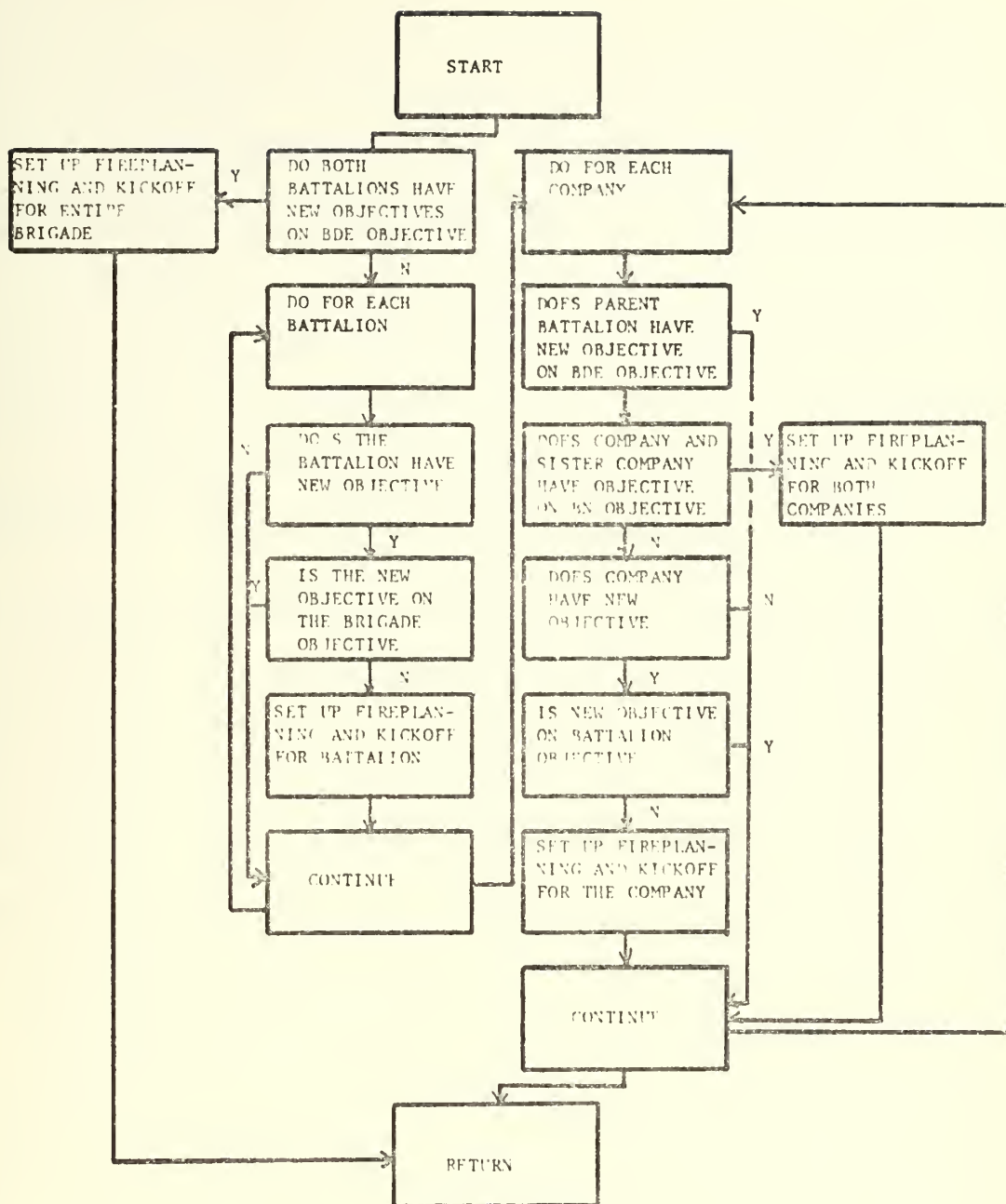
Every ten minutes and one second before generation of an artillery target of opportunity, the model goes through an update sequence. This sequence consists of four basic steps, namely:

- a. Step 1

Unit fire planning centers are updated. This is accomplished as described in paragraph B,3 above.

- b. Step 2

Unit control states are verified for each unit. It is during this step that changes in unit status are made.



FIREPLANNING AND ATTACK COORDINATION LOGIC

FIGURE 9

c. Step 3

New objectives are assigned if the need exists. This step is described in paragraph B,1 above.

d. Step 4

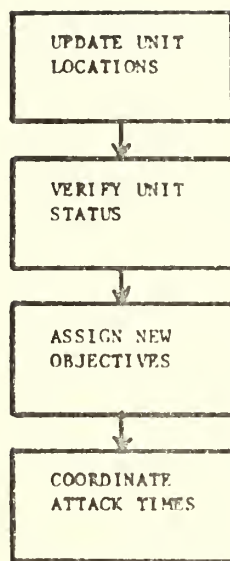
Unit attack times and fire planning are coordinated if a need exists for coordination.

The update sequence is controlled by Subroutine DECIS. The sequence is shown diagrammatically in Figure 10.

C. POSITIONING, MOVEMENT, AND CONTROL OF ARTILLERY UNITS AND WEAPONS

Initially, an artillery battery is positioned behind the geometric center of the front line of each of the maneuver battalions. The third battery is positioned in the center of the brigade area of responsibility. The exact location of each battery in northing and easting is a normal variate about the respective fireplanning centers of the maneuver elements involved.

The azimuth of fire of each battery is initially the angle from the battery center to the center of mass of all company level planned targets. In subsequent position areas, the azimuth of fire for each battery is computed in an analogous manner with the exception that the centers of mass used are the company planned target center of mass points for the appropriate battalions. The center battery in subsequent position areas is layed on the center of mass of company level planned targets for all companies. In the event that there are no company level planned targets at a particular time, a default azimuth of fire of 0000 mils is assigned.



THE UPDATE SEQUENCE

FIGURE 10

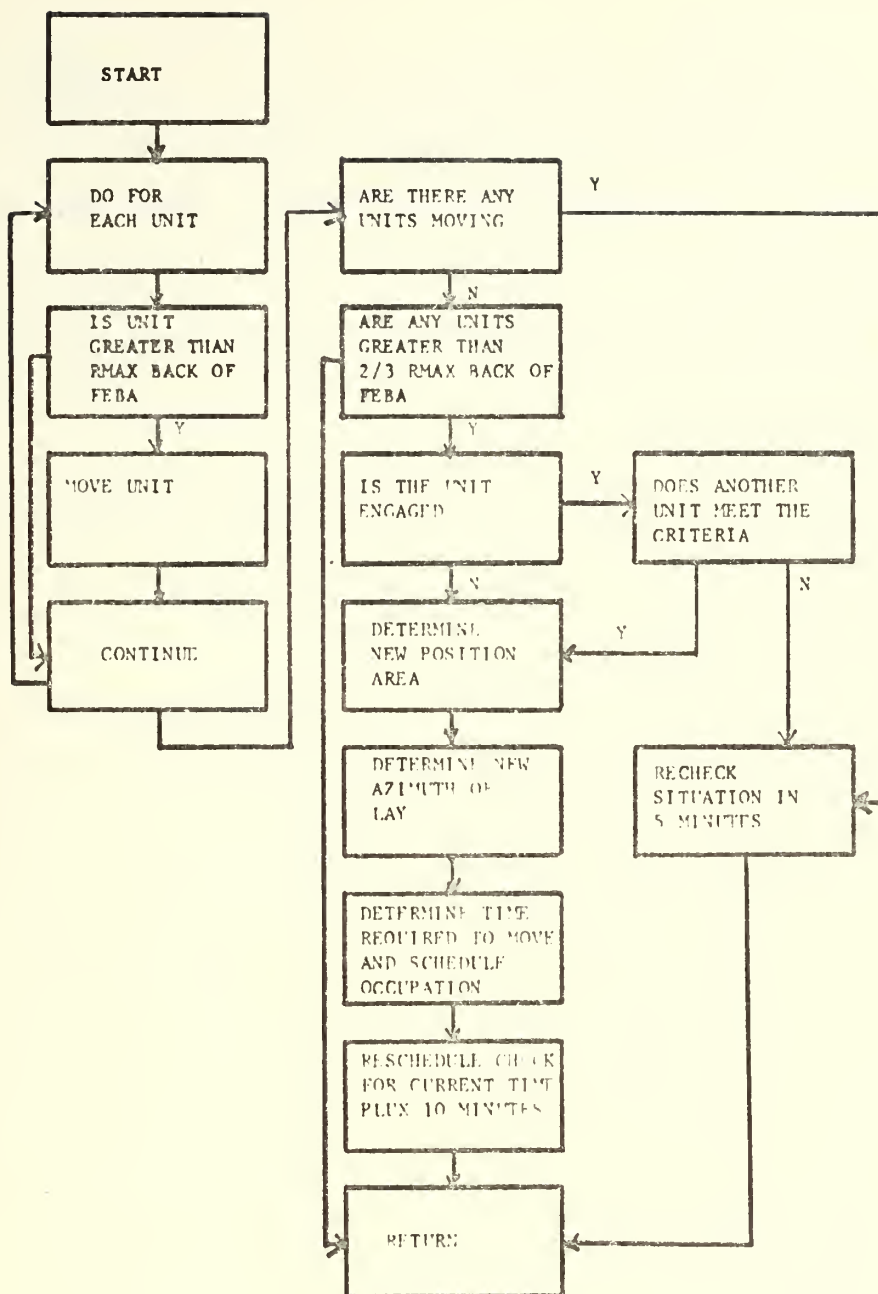
Each weapon in the battery is positioned with respect to the battery center based on input parameters. The parameters describe the bounds on the x and y coordinates of each weapon in a coordinate system with origin at the battery center and positive y axis aligned along the direction fo fire.

Each artillery battery position is validated as still being within supporting range every 10 minutes during the simulation. A battery is said to be in supporting range of the respective unit if the distance between the battery center and the appropriate FPC is less than $2/3$ the maximum range. When some battery is greater than a distance of $2/3$ maximum range, it is moved provided two conditions are satisfied. First, no unit can move while it is engaged in a fire mission. If the unit selected to move is engaged in a fire mission, the time for the move is delayed until the mission is completed. Secondly, only a single unit is permitted to move at any particular time. In the event that a unit is selected for movement but the movement is constrained, the decision cycle is halved from 10 to five minutes. The movement logic is shown in Figure 11.

Control of the artillery batteries is established using three states described as follows:

1. State 1

The unit is not engaged in a fire mission. The unit is free to move provided no other artillery units are moving.



ARTILLERY MOVEMENT LOGIC

FIGURE 11

2. State 2

The unit is actively engaged in a fire mission. Movement must be delayed until the fire mission is completed.

3. State 3

The unit is moving. While the unit is moving, it is not available for fire missions.

D. FIREPLANNING AND FIRE ALLOCATION

The types of planned targets simulated in the model are as follows:

1. Scheduled Target

A scheduled target is one for which a need can be anticipated for artillery fire. This type of target is engaged at some pre-specified time without any additional request for fire.

2. On-Call Target

An on-call target is one for which a need for fire is anticipated; however, no precise engagement time can be prespecified.

3. Preparation Target

A preparatory target is one which will be engaged in support of the initial phase of the attack. All preparation type targets are engaged in accordance with a specified fire plan which is generated in the model.

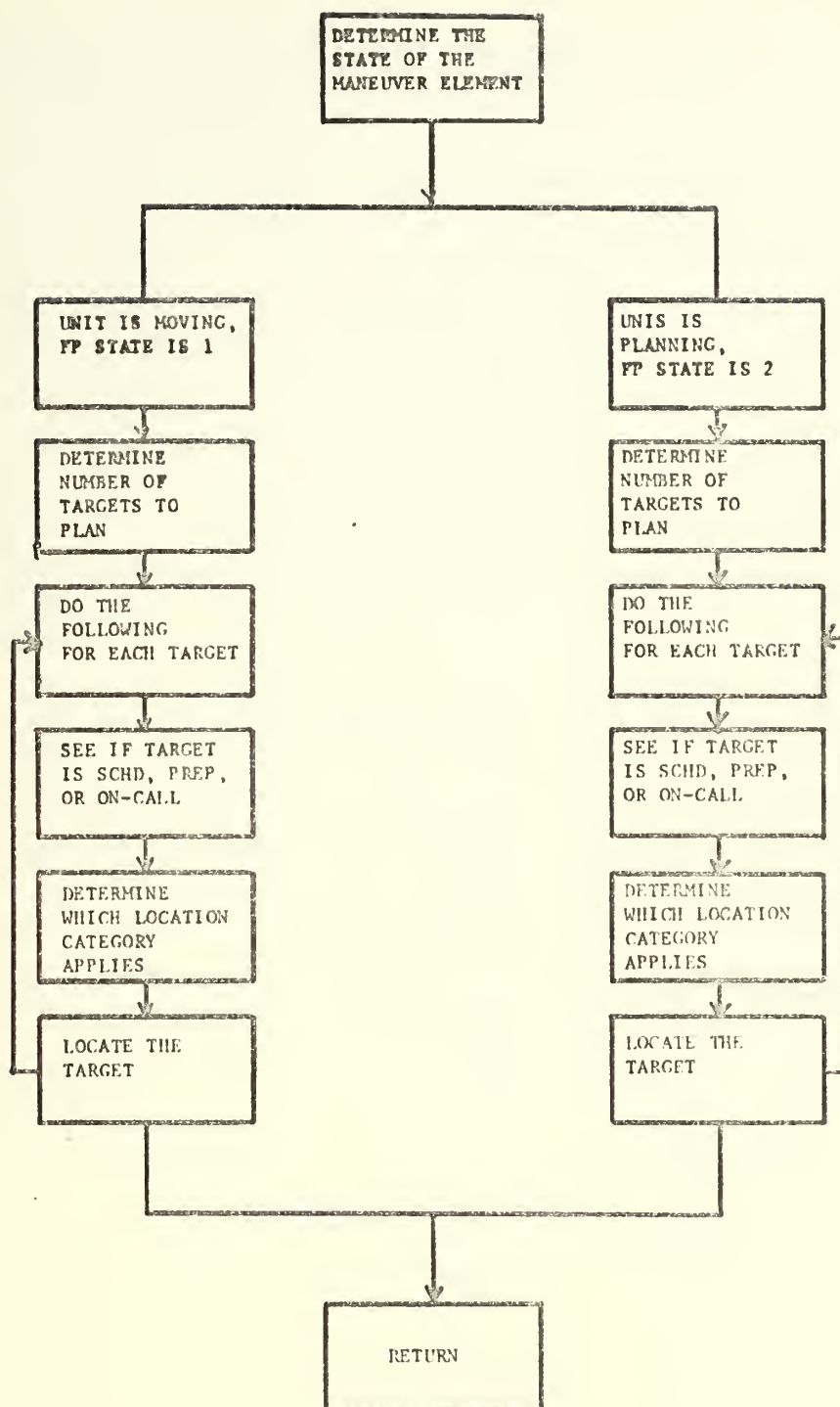
Planned targets are further categorized into three subcategories according to relative location. Targets are classified as lying between the lines of departure (or FEBA) and the objective, on the

objective, and beyond the objective. The probability that an arbitrary planned target falls in one of these location categories is conditioned on the actual fireplanning stage. The specific probabilities involved are a function of unit size and stage. For fireplanning purposes a maneuver element can be in one of two stages, stage 1 or stage 2. A specific unit is considered to be in stage 1 if it is in control state 1; otherwise it is considered to be in stage 2.

The number of targets which will be planned at a given time is a function of the fireplanning stage a unit is in when fireplanning takes place. In this model the total number of targets selected is a conditional discrete random variable. Actual target locations are determined in routines which are described in paragraph E. The fireplanning process is described diagrammatically in Figure 12.

Fire allocation consists of assigning responsibility for a specific target to a specific artillery unit. In this model, target responsibility is assigned to battery level. In the case of scheduled targets, one battery is assigned responsibility for all targets generated by a specific battalion. The center battery is assigned responsibility for the targets scheduled by the brigade. The time for fire is based on the distance between the brigade fireplanning center and the target and the brigade mean rate of advance which is an input parameter.

Preparatory targets are assigned to specific units based on range, time for attack, and an equitable distribution of responsibility. In



FIREPLANNING LOGIC

FIGURE 12

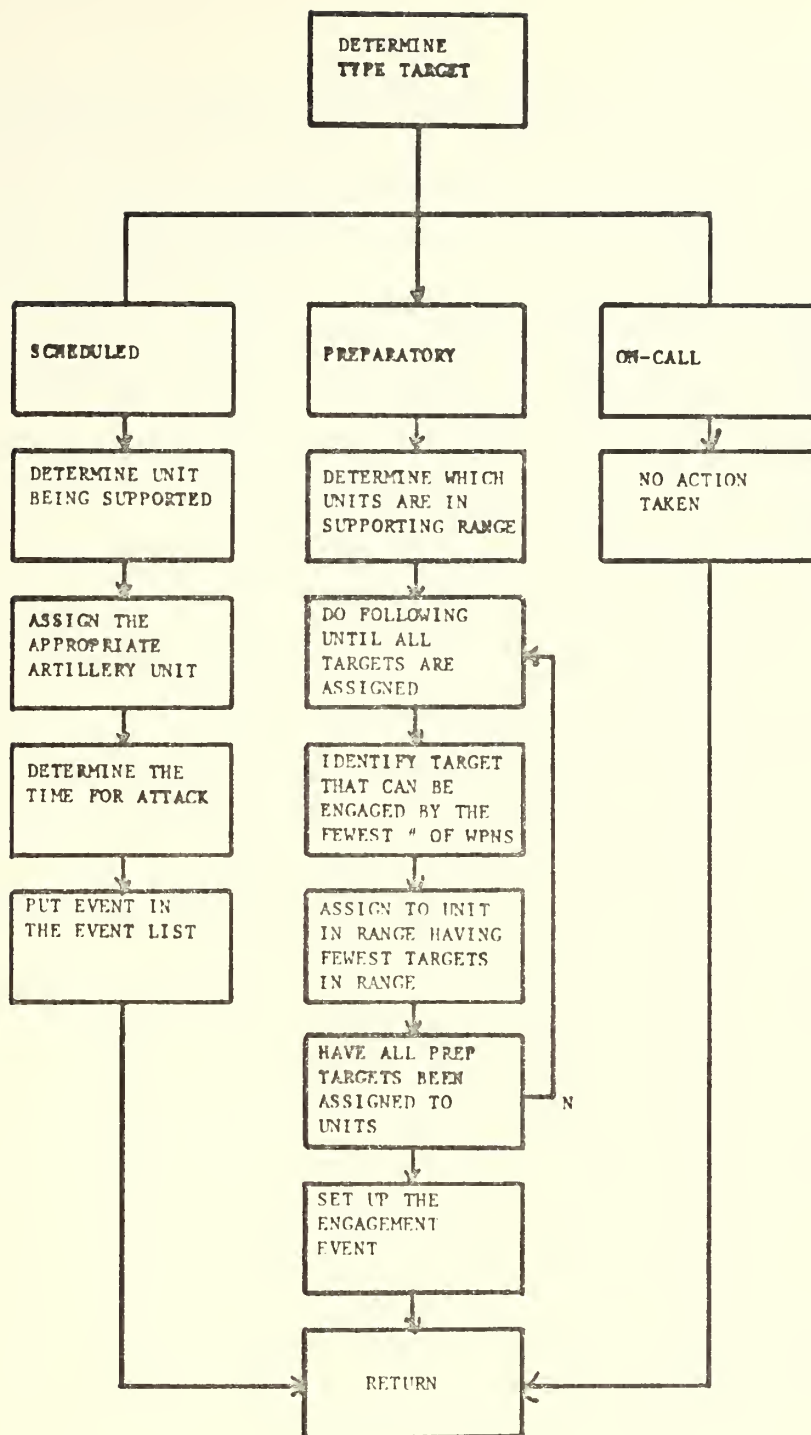
allocating the preparatory fires, the model determines the total number of units which are within range of each target first. Those targets which can be reached by the fewest number of units are then assigned to the unit which can engage the fewest number of targets. The time for attack is based upon the number of targets a specific unit must engage during the preparatory fire phase. The time increment used is two minutes per target. If, for example, a unit had three targets to engage, the first would be engaged at the attack hour (HHOUR) minus four minutes, the second at HHOUR minus two minutes, and the last at HHOUR.

E. LOCATION AND DESCRIPTION OF TARGETS

There are two separate target location routines in the model, one for planned targets and the other for unplanned targets. The scheduled targets are located based upon the general location category which applies. The categories and a brief discussion of the algorithms in each case are given below:

1. Planned Target

For the purposes of target location the term "planned target" applies to all targets which are not classified as targets of opportunity. Due to this distinction, all planned targets can be further categorized into one of three general location categories, namely: between the line of departure (or FEBA) and the objective, on the objective, and beyond the objective. The exact easting and northing coordinates of the target centers are considered to be



FIRE ALLOCATION

FIGURE 13

independent uniform variates. The bounds applicable for each category for a particular unit are as shown in Figure 14.

2. Target of Opportunity

A target of opportunity has associated with it one of the four maneuver companies. The location of a target of opportunity is related to the unit boundaries as shown in Figure 15. In this case the easting and northing coordinates are independent uniform variates. The edges of the box in Figure 15 define the endpoints of the appropriate intervals.

All targets in the model are assumed to be personnel targets. Two general size categories are available. The input parameters define the size parameters and the probability that a random target will belong to one of the two categories.

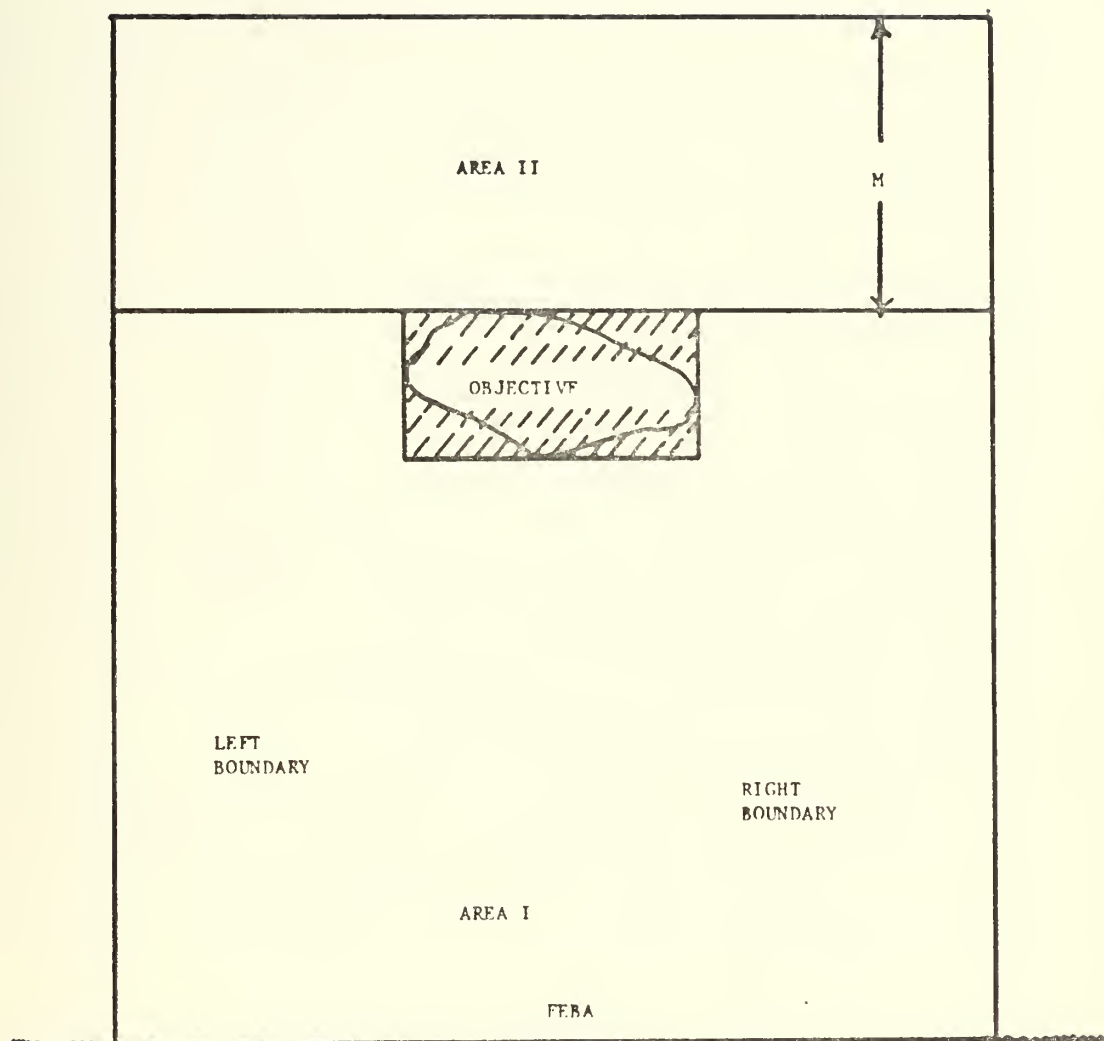
Targets in the model are portrayed by arranging a random number of target elements uniformly within a rectangular array. For purposes of target geometrical description, three zones are defined and identified as Zone 1, Zone 2, and Zone 3. The target-zone organization is shown in Figure 16. The zones have the following significance:

1. Zone 1

Zone 1 is that geographical area within which 50% of the target elements are located.

2. Zone 2

The geographical area within which 40% of the target elements lie.



AREA I - BETWEEN LD (OR FEBA) AND OBJECTIVE

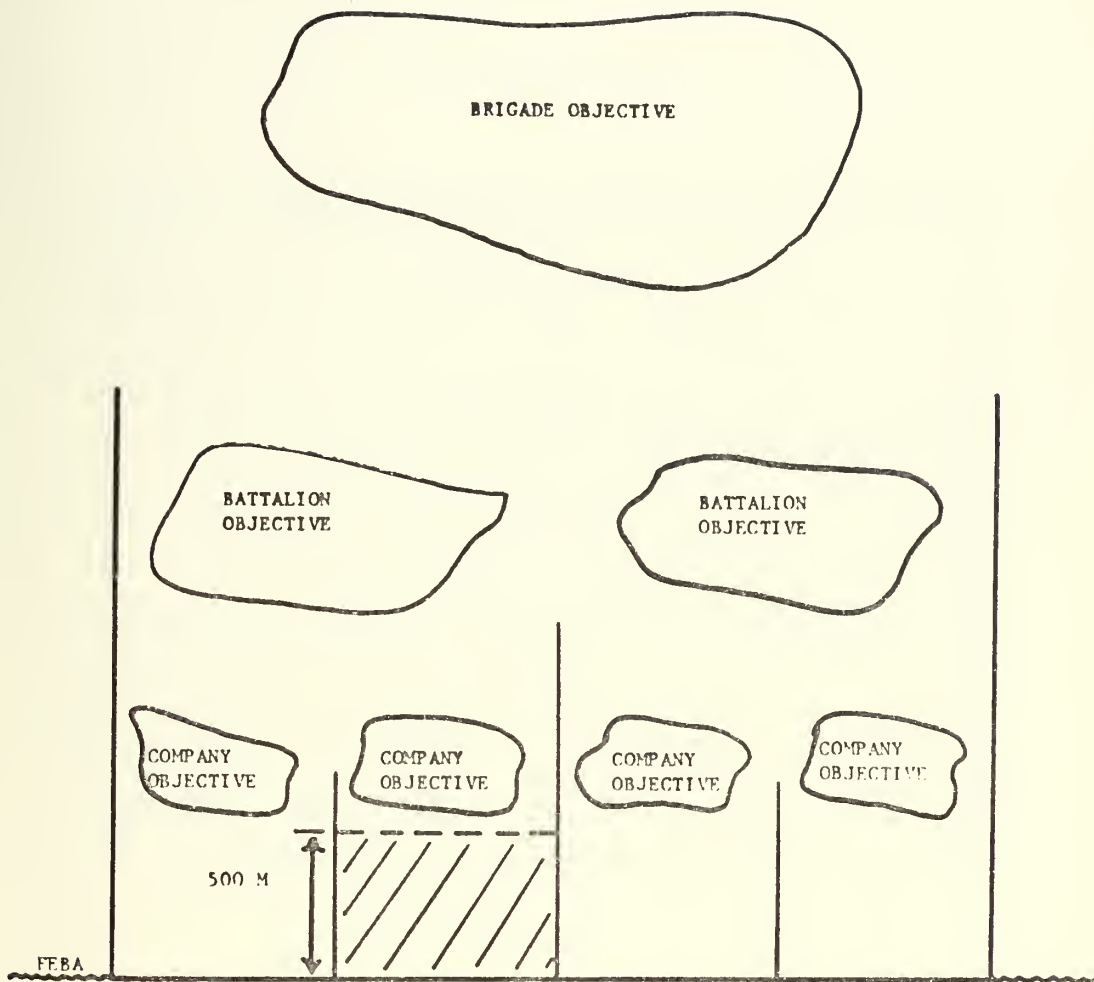
AREA II - BEYOND THE OBJECTIVE

///// - ON THE OBJECTIVE

M = $\begin{cases} 1000 \text{ M} - \text{COMPANY} \\ 2000 \text{ M} - \text{BATTALION} \\ 3000 \text{ M} - \text{BRIGADE} \end{cases}$

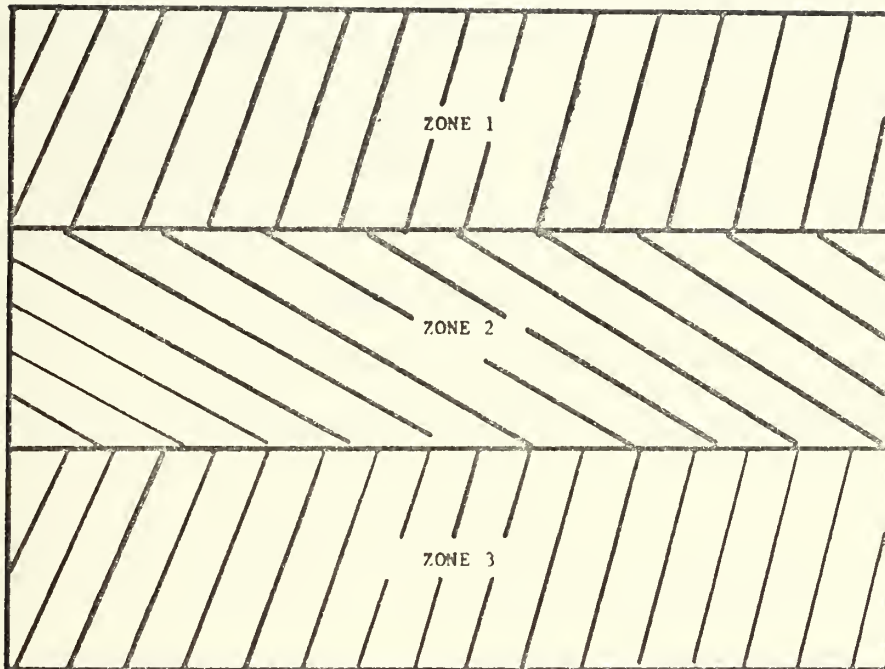
TARGET LOCATION CATEGORIES

FIGURE 14



TARGET LOCATION BOUNDARIES FOR TARGET OF OPPORTUNITY

FIGURE 15



FFBA

TARGET-ZONE ORGANIZATION

FIGURE 16

3. Zone 3

That area within which the remaining 10% of the target elements are located.

Within each zone the exact location of a specified target element is described by easting and northing coordinates which are independent uniform variates having the respective zone boundaries as bounds.

The logic involved in describing a target is shown in Figure 17.

All targets are considered to be stationary and homogeneous. The lethality considerations involved are discussed in paragraph J below.

A preset probability of 0.3 is used in the model to determine if there is, in fact, a target located at the designated point in the case of planned targets. If it is determined that there is a target there, it is considered to fall into size Category II.

F. ERRORS IN THE FIRE SUPPORT SYSTEM

The errors simulated in the model can be categorized as firing errors and non-firing errors. The basic non-firing errors included are:

1. Artillery Unit Position Error

Artillery unit position error is defined as the deviation in easting and northing of the actual unit center from that which was assigned. The result of this error is felt in the firing process by virtue of the fact that the assigned location is that location from which the unit firing data are computed. The result is a constant error component in the total round error term. This error

is normally compensated for in the adjustment process. The two components of this error, deflection and range, are assumed to be independently distributed normal variates with mean, $\mu = 0$, and variance σ^2 , input as a model parameter.

2. Target Location Error

Target location error is defined as the deviation of the actual target location from that reported by the forward observer. This error is applied when targets of opportunity are being engaged. In this case, the error is compensated for in the artillery adjustment process. If no adjustment takes place, the round impact point will have a constant error component equal to the target location error.

This error is assumed to be a function of the distance between the forward observer and the actual target. The error is expressed in the model as consisting of a distance component and a deflection component. These components are independently distributed normal variates with means equal 0 and variances given by the relationships:

$$V_{\text{dist}} = a + bx$$

$$V_{\text{def}} = c + dx$$

where

V_{dist} = Variance of the distribution of the distance component

V_{def} = Variance of the distribution of the deflection component

x = Distance between the forward observer and the target
expressed in meters

"a", "b", "c", and "d" are input parameters to the model.

3. Burst Location Error

Burst location error is defined as the deviation between the actual burst location and the location sensed by the forward observer in the adjustment process. This error is also assumed to be expressible as independently distributed normal variates with distribution parameters defined in the same fashion as those for the target location error.

The only firing error simulated in the model is the terminal ballistic error. The basis for information concerning this error is "probable error" information tabulated experimentally and disseminated for use in the current weapon firing tables. The "probable error" in either range or deflection is defined as the distance within which 50% of the rounds should fall in either deflection or range as appropriate. This information is input to the model and internally converted to distribution variances. The range dispersion and the deflection dispersion are assumed to be independently distributed normal variates with mean equal 0 and variances a function of range and the probable errors as discussed above. Chebychev's inequality and application of the definition of probable error are used to convert a probable error into a distribution variance for some specific range.

Other ballistic firing errors such as internal ballistic errors and errors due to nonstandard meteorological conditions are not represented in the model.

G. TIME FACTORS IN THE FIRE SUPPORT SYSTEM

The time factors included in the model can be categorized as pertaining to the maneuver elements or to the artillery.

1. Time Factors for the Maneuver Elements

The maneuver element times considered were:

a. Movement Rate

The movement rate is assumed to be a uniform random variable measured in kilometers/hour. Each time a unit is required to move during the simulation, the movement rate to apply for the move is obtained by sampling from the distribution. The variation in the rate is assumed to compensate for variation in terrain, etc.. Different type units can be portrayed from a mobility point of view by proper selection of the movement rate.

b. Search and Seizure Time on the Objective

This factor is used to account for the time a unit requires once it reaches an objective to secure the objective. During the simulation a unit objective is not classified as secure until the unit has been on the objective for this specified period of time. The time increment used in the model is forty-five minutes and is fixed.

c. Reorganization and Consolidation Time

This time factor accounts for the time it takes a unit to plan, reorganize, and resupply itself once an objective has been secured. A unit is not allowed to continue the attack in the model until some random time after the unit has secured its objective.

This time increment is a uniformly distributed random variable. The distributions are dependent upon the unit size and situation as described below:

(1) Case I. Both battalions have as their new objectives portions of the brigade objective. In this case all companies conduct a coordinated attack. The time required to coordinate the attack is a uniform variate measured in seconds with lower and upper bounds of 2400 seconds and 4200 seconds respectively.

(2) Case II. One of the battalions is assigned a new objective not on the brigade objective. In this case, the planning time increment is a uniform variate measured in seconds with lower and upper bounds of 1800 seconds and 3600 seconds respectively.

(3) Case III. Both companies of a battalion have new objectives on their battalion objective where the battalion objective is not the brigade objective. In this case, the planning time increment is uniformly distributed with lower and upper bounds of 1800 seconds and 2400 seconds respectively.

(4) Case IV. A company has a new objective not a portion of the battalion objective and the present company objective is not on the battalion objective. The planning time is a uniform variate with lower and upper bounds of 900 seconds and 1800 seconds respectively.

2. Artillery Movement and Preparedness Times

a. Movement Rate

The movement rate is measured in kilometers/hour and is treated as a normal random variable in the model. The variation makes allowances for varying terrain and security conditions.

b. March Order Time

The march order time is the time interval between time of receipt of an order to move and the time the unit is in march formation ready to proceed with the movement. This time increment is assumed to be a normal variate measured in seconds.

c. Emplacement Time

The emplacement time is the time interval from the time the unit arrives at the new position area and the time the unit is ready to engage a target. The time is a normal variate measured in seconds.

3. Fire Mission Processing Times

Time required to process a particular fire mission is a function of the type of mission. Each of the individual time increments in the firing chain is a truncated normal variate. The parameters defining the distributions of these variates are input parameters. A description of the total processing time for each type mission is given below:

a. Target of Opportunity

There are three distinct phases of an engagement of a target of opportunity, namely: the mission preparation phase, the adjustment phase, and the fire for effect phase. If T_p is the time required for the forward observer to prepare a request for fire, T_t is the time required for the observer to transmit the request for fire to the fire direction center, and T_a is the time required for the

fire direction center to analyze the target, select units to fire, compute the firing data, and transmit the data to the firing units, then T_1 , the time required for the mission preparation phase, is simply

$$T_1 = T_p + T_t + T_a .$$

If T_f^i is the time required for the fire unit to prepare and fire the i th volley in adjustment; T_o^i is the time of flight for the i th volley; T_c^i is the time required by the forward observer to determine the necessary adjustment corrections for the i th volley and transmit them to the fire direction center; T_s^i is the time required for the fire direction center to compute subsequent firing data for the i th volley and transmit it to the adjusting battery; and N_a is the number of volleys required for the adjustment, which is a random variable, then T_2 , the time required for the adjustment phase, is

$$T_2 = \sum_{i=1}^{N_a} T_f^i + T_o^i + T_c^i + \sum_{j=1}^{N_a-1} T_s^j .$$

For the fire for effect phase, a distinction must be made concerning the method for determining subsequent aimpoints after the first. Two mission types are defined to make the distinction clear:

- (1) Mission Type 1: N_e volleys are fired, all volleys fired at the same aimpoint.
- (2) Mission Type 2: N_e volleys are fired, all volleys being fired at different aimpoints.

If F_a is the time required for the fire direction center to compute firing data for a new mass point, determine the mass point, and transmit the data to the firing units; F_{p1} is the time required for a fire unit to prepare and fire a new volley assuming the firing data are different from the last volley; and F_{p2} is the same as F_{p1} except that it is assumed the same data are fired each time; then T_3 , the time required for the fire for effect phase is

$$T_3 = F_a^1 + F_{p1}^1 + T_o^1 + \sum_{i=2}^{N_e} F_{p2}^i + T_o^i$$

for a mission of type 1, or

$$T_3 = \sum_{i=1}^{N_e} F_a^i + F_{p1}^i + T_o^i$$

in the case of mission type 2.

The total time required for a target of opportunity type mission, T_M , is then

$$T_M = T_1 + T_2 + T_3$$

b. Scheduled Targets

In the case of scheduled targets, the determination of the initial aimpoint, computation of firing data, and transmission of firing data to the fire units are accomplished during slack time. It is assumed in the model that the initial volley in the case of a scheduled target is fired at a specified time. Using the same notation

developed above, then, the time required for a scheduled target is

$$T_M = T_o^1 + \sum_{i=2}^{N_e} F_{p2}^i + T_o^i$$

for a type 1 mission, or

$$T_M = T_o^1 + \sum_{i=2}^{N_e} F_a^i + F_{p1}^i + T_o^i$$

for a type 2 mission.

c. Preparatory Targets

In the case of preparatory targets, the target is always engaged with a single volley. In the event that there is more than a single target in the preparatory fires scheduled for the same unit, the targets are scheduled two minutes apart. The only time consideration for this type target is the time of flight for the volley.

H. TARGET ENGAGEMENT STRATEGY

The strategy used to engage a specific target is dependent upon the type target being engaged primarily. The engagement strategy in the case of a target of opportunity consists of a decision as to whether or not an adjustment will be conducted, a decision concerning the number of volleys to be fired in effect, and an algorithm for determining what specific aimpoint will be used for each of the volleys.

In the simulation the number of volleys to be used in fire for effect is a discrete random variable the distribution for which is an

input parameter. The model provides for different distributions for targets of opportunity with adjustment and scheduled targets or targets of opportunity without adjustment.

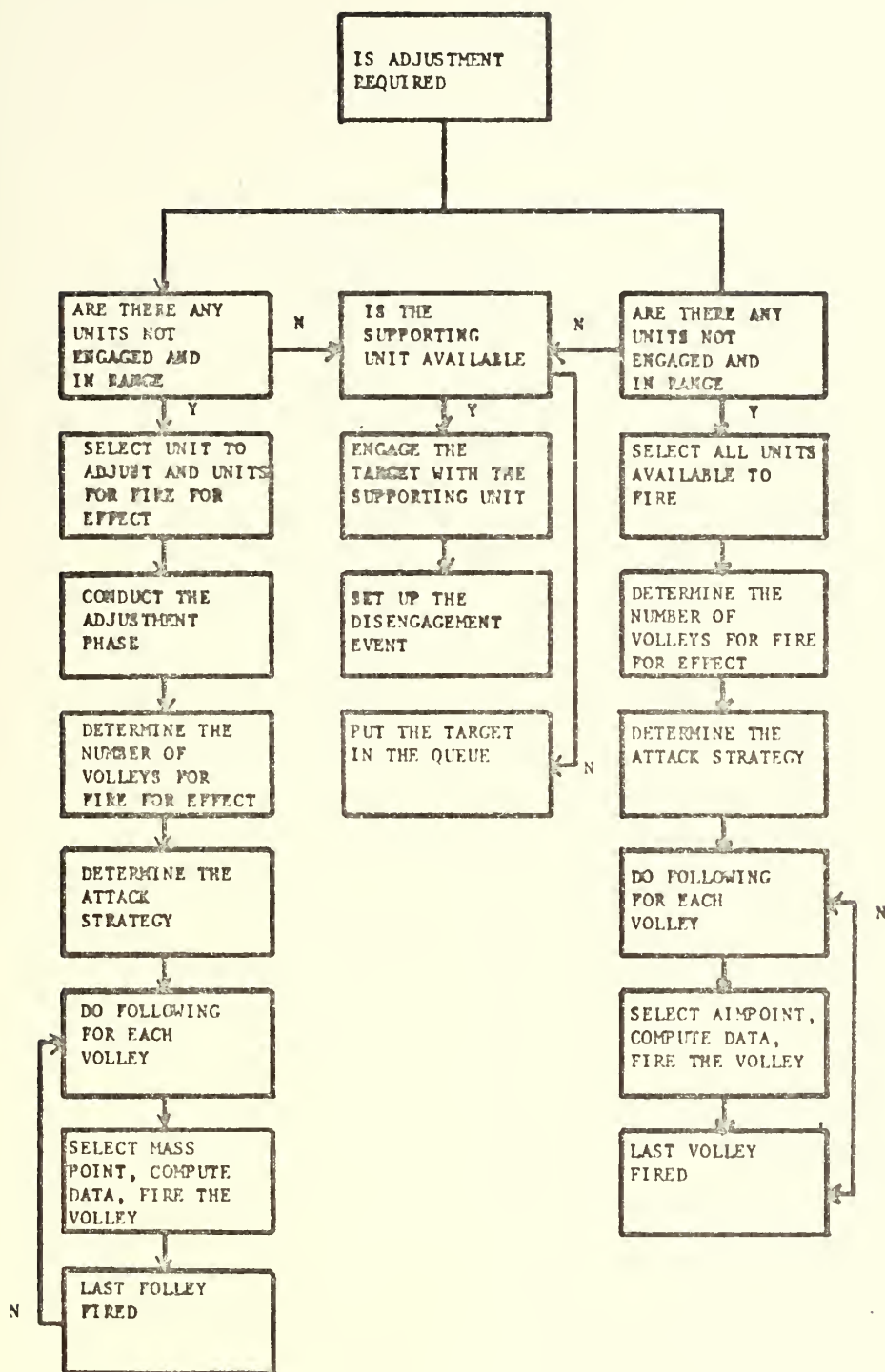
The specific aimpoint for a particular volley in fire for effect is a random variable. For purposes of determining the aimpoint, a rectangle of specified dimensions is superimposed over the reported or adjusted target location. The sides of the rectangle then define the upper and lower limits in range and deflection for the two distributions. The coordinates in easting and northing of the aimpoint are considered to be two independently distributed uniform variates.

The selection of a specific aimpoint then depends in part upon the dimensions of the rectangle. The model provides for the specification of up to eight different sets of specifications and two eight point probability distributions on these specifications. One distribution applies to missions in which adjustment takes place; the other deals with the case where adjustment does not take place. In both cases, the first set of specifications provides for the same aimpoint being used for each volley in the fire for effect phase.

In the case of preparatory targets, the engagement strategy is fixed. In this case, a single volley from a single battery is fired on the reported target location.

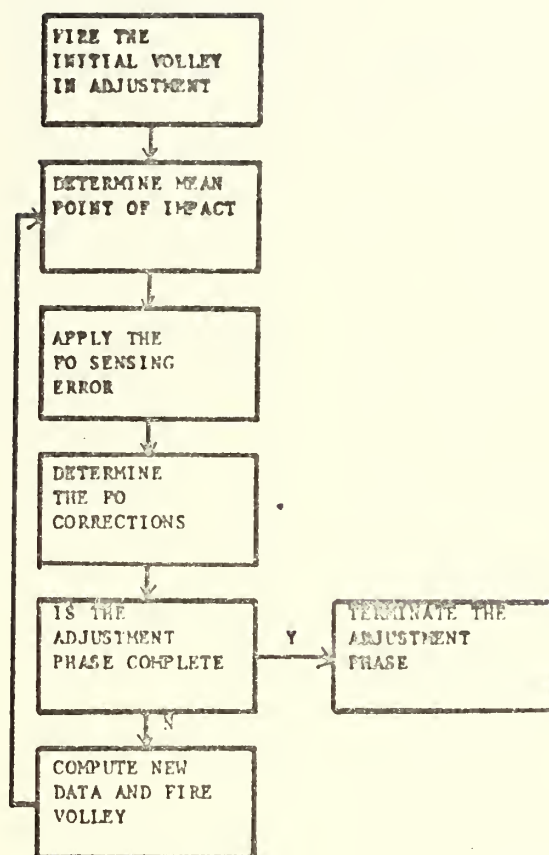
I. TARGET ENGAGEMENT SEQUENCE

The sequence used in firing a target of opportunity is shown in Figure 18. The adjustment sequence is described in greater detail in Figure 19.



TARGET OF OPPORTUNITY SEQUENCE

FIGURE 18



ADJUSTMENT SEQUENCE

FIGURE 19

Scheduled targets are engaged using the sequence in Figure 20.

Preparatory targets use the sequence in Figure 21.

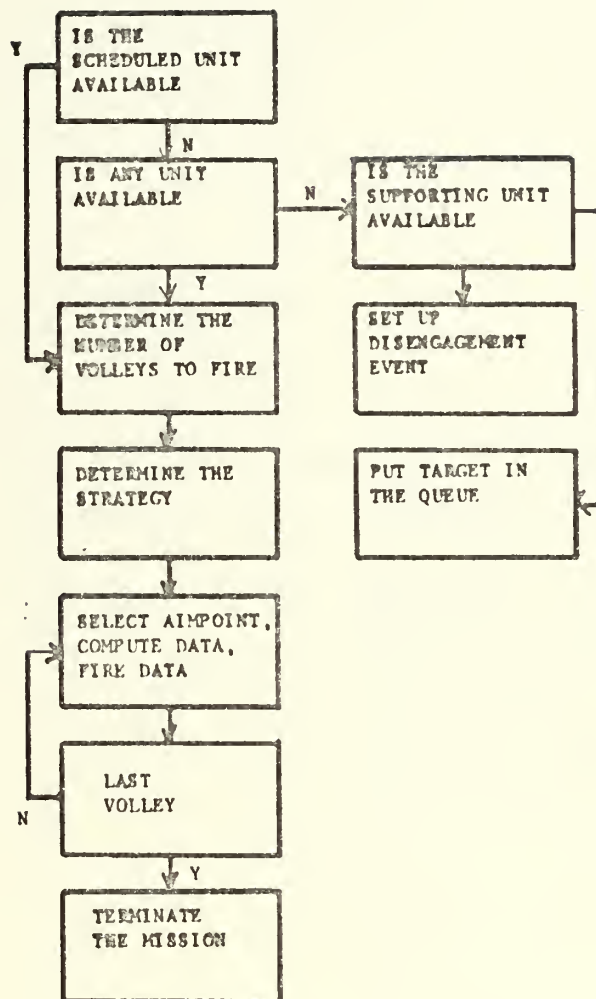
Fire missions are fired as they are generated if units are available. Once the engagement of a target is initiated, it is continued without interruption until the mission is terminated. In the event a mission cannot be fired when the need arises, the mission is placed in a queue until a unit becomes available. There are four queues arranged in priority from one to four. The type target and queue priority are shown below:

- (1) Target of Opportunity
- (2) Preparatory Target
- (3) Scheduled Target
- (4) On-Call Target

Upon the completion of a fire mission, the queues are checked in order of priority and if a target is in the queue it is engaged next. In the event of multiple targets in a queue of the same priority, a first-in first-out rule is used.

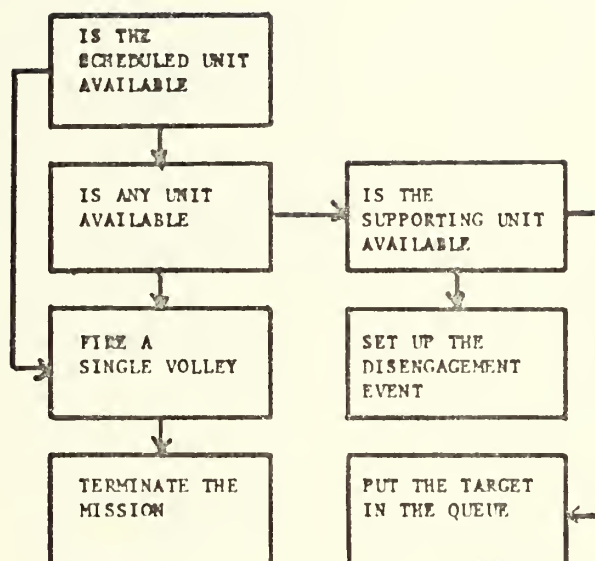
J. LETHALITY AND DAMAGE ASSESSMENT

The targets in the model are homogeneous stationary targets. They are homogeneous to the extent that all target elements are subject to the same lethality function. In actuality, each target element would probably be subject to a different lethality function. For example, an element in a dug-in position with overhead cover some X distance from a burst would not have the same probability of becoming a casualty as another target element the same distance away standing in an erect position.



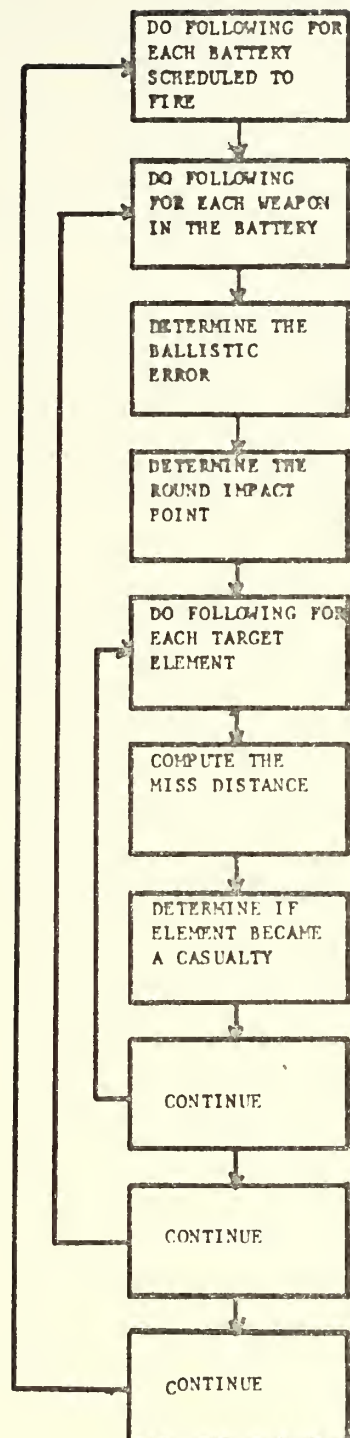
SEQUENCE FOR SCHEDULED TARGET

FIGURE 20



SEQUENCE FOR A PREPARATORY TARGET

FIGURE 21



DAMAGE ASSESSMENT FOR A SINGLE VOLLEY

FIGURE 22

It has been shown empirically that target lethality can be described generally as follows (See Weiss):

$$f(x) = e^{-\frac{x^2}{g^2}}$$

In the above relation, $f(x)$ represents the probability that some target element x distance from the burst point will become a casualty. The symbol g represents the parameter of the function. One would expect that

$$g = g(r_1, r_2, r_3, \dots, r_n)$$

where r_i represents some effect due to specific target element characteristics or the characteristics of the round being fired such as average size of fragmentation, etc.. Since the target set is considered homogeneous and only a single type round is considered available to the units, g becomes a specified parameter and is applicable to each burst and target element combination.

In accomplishing damage assessment each burst is located and the distance to each target element is determined. This distance is the independent argument of the lethality function. The resulting probability of becoming a casualty is determined and the outcome is determined by sampling from a uniform distribution.

IV. EFFECTIVENESS MODEL

Two basic measures of effectiveness are considered in the model, casualty producing rate and the average number of rounds per casualty inflicted. Each of these measures is described briefly in this section.

If T_k is the total engagement time in seconds for the k th target (where the k th target is a target of opportunity) and C_k is the total number of casualties inflicted on the target, then R , the casualty producing rate, is expressed as

$$R = \frac{\sum_{i=1}^n T_k}{\sum_{i=1}^n C_k} .$$

At the completion of the simulation run, the value of R is calculated and the result is listed in the output report. In addition to the aggregate casualty rate, the casualty producing rate applicable to each target of opportunity is also calculated and is an element in the target history summary for that particular target.

The average number of rounds per casualty is calculated using

$$S = \frac{N}{T}$$

where:

N = Total casualties inflicted on targets of opportunity

T = Total rounds fired on targets of opportunity

Similarly, as above, the appropriate number of rounds per casualty for each target of opportunity is calculated for each separate target also and is an element in the target history summary for that target.

The basic queue statistics for each of the four queues are also provided and serve as secondary measures of effectiveness. For each queue, the average queue length and the average time in the queue for all targets spending time in the queue are provided. The average queue length for each queue is estimated by sampling each queue every 10 seconds during the simulation and then taking a simple average. The average amount of time spent in the queue for targets entering the queue is computed for each queue by taking the simple average over all targets entering the queue in questions, i.e., if K_m is the average time in queue m then

$$K_m = \sum_{i=1}^N \frac{T_i^0 - T_i^I}{N}$$

where:

T_i^0 = Time the i th target in the queue left the queue

T_i^I = Time the i th target entered the queue

N = Total number of targets entering the queue

V. DISCUSSION OF THE MODEL

Some typical questions which might be asked concerning an artillery fire support system were introduced in the Introduction to this paper. It is the purpose of this section to enumerate some areas in which this model might be a useful analytical tool and to discuss some basic limitations of the model.

A. POTENTIAL AREAS FOR USE

Potential areas for use are closely related to those system variables which were selected as parameters in the modelling process. These parameters are entered in the input data stream. The parameters can be categorized as pertaining to the following areas: (1) the geometric characteristics of the battlefield and the maneuver force; (2) force movement rates; (3) time factors in the target engagement sequence; (4) geometrical and lethality characteristics of the target complex; (5) target attack strategies; (6) ballistic dispersion; (7) artillery employment configurations; (8) location errors to include artillery unit location errors, burst location errors, and target location errors.

Through the manipulation of the geometric characteristics of the battlefield, the model can be used to gain insight into a number of basic areas, several of which are as follows:

(1) Varying the front line widths can give insight into the sensitivity of the measures of effectiveness to these changes. As the front line width is increased without bound a point is reached where

the supporting artillery is unable to support elements at the extremes of the front line due to the range limitations of the weapon system. The interaction and interdependencies in front line width, maximum weapon range, and artillery unit employment policy in terms of lateral dispersion of fire units and depth displacement can be analyzed as they pertain to the measures of effectiveness.

(2) The distance to the unit objectives has implications on the number of times the supporting artillery units must move forward to support the force, which in turn has an effect on the number of weapons and units available at a given time to satisfy the mission requirements. The model can be used to study the sensitivity of the basic measures of effectiveness to changes in the objective distance. In this regard, weapon maximum range and the movement rates can also be varied to determine what interactions might exist between these, the measures of effectiveness, and the objective distance.

Manipulation of the force movement rates can provide insight into the following basic areas:

(1) As the movement rate of the maneuver force increases, it generally becomes more difficult for the artillery to provide continuous and timely support. The model can be used to investigate the relationship which might exist between the movement rate of the supported force, weapon maximum range, employment policy, etc., and the measures of effectiveness.

(2) The effect of movement rate of the artillery units on the measures of effectiveness can also be investigated.

The time factors in the engagement sequence can be manipulated to study the relationship between the average queue length and the time required to process a mission.

The target characteristics can be manipulated in terms of density, length and width, and vulnerability in terms of lethality characteristics of the weapon target combination, in order to study the sensitivity of the measures of effectiveness to changes in these parameters.

Other studies similar to the above can be conducted pertaining to the other parameters. The sensitivity of the effectiveness measures to the precision with which the forward observer locates the target can also be investigated. The relative effectiveness of different artillery battery configurations can also be investigated.

B. MODEL LIMITATIONS

There are several basic limitations in the model. Time and resources did not permit the empirical verification of the form of the underlying distributions for the random variables in the model. An effort was made to select from the more common distributions those forms which were most likely from an experience point of view. Representation of the variances of distribution in some cases as linear functions of range is likewise not supported by empirical evidence. The purpose here was to interject a range

dependence on the appropriate error in as simple a fashion as possible. Any investigation to which this is a critical factor should include a more careful modelling of this particular aspect.

While an attempt was made to include most factors in the model which were basic from a system design point of view, many were out of necessity omitted. Two of the more basic factors omitted were logistical constraints and the absence of any error introduced by varying meteorological conditions.

Due to the physical storage constraints in the computer, there is an upper bound on the size of the storage arrays which can be used for storage of critical information. It is possible to select input parameters which will generate more targets than the program is designed to handle simultaneously. In the event insufficient storage is available to handle such cases, the program includes a routine to print out a suitable message to indicate to the user that overflow conditions have been detected and to identify the particular array which is in an overflow condition. Upon the detection of such a condition, the program terminates. The run statistics up until this time are presented prior to termination as if the run had made a normal termination by the brigade achieving the final objective.

APPENDIX A

Program Names

Data is stored in the model in table form. There are three principal tables for storage of information pertaining to units and targets, namely: GDATA, ARDATA, and TGT. A fourth table, PRDATA, is the storage medium for parameters of the probability distributions in the model.

This appendix is organized into five tabs, Tab 1 - Tab 5. Tab 1 through Tab 4 describe the contents of the four tables previously mentioned. Tab 5 identifies the principal miscellaneous variables in the computer program. The tabs are organized as follows:

- Tab 1 - GDATA Table
- Tab 2 - ARDATA Table
- Tab 3 - TGT Table
- Tab 4 - PRDATA Table
- Tab 5 - Miscellaneous

Tab 1

APPENDIX A

GDATA TABLE

This table contains all information pertaining to each of the seven maneuver elements in the model. The table is organized into seven rows (one for each unit) of 20 columns each (7x20). The table entries are identified as follows:

GDATA(I,1)	Unit identifier for Unit I.
GDATA(I,2)	Current control state for Unit I.
GDATA(I,3)	Easting coordinate of the west front line end point for Unit I.
GDATA(I,4)	Northing coordinate of the west front line end point for Unit I.
GDATA(I,5)	Easting coordinate of the east front line end point for Unit I.
GDATA(I,6)	Northing coordinate of the east front line end point for Unit I.
GDATA(I,7)	Easting coordinate for the current objective center for Unit I.
GDATA(I,8)	Northing coordinate for the current objective center for Unit I.
GDATA(I,9)	Length of the major axis for the current Unit I objective.
GDATA(I,10)	Length of the minor axis for the current Unit I objective.
GDATA(I,11)	Attitude of Unit I objective. The attitude is defined as the clockwise angle measured in radians from true North to the minor axis of the objective. The angle is a uniform variate in the interval $(-.528,+.528)$.

GDATA(I,12)	Easting coordinate of the current fire planning center for Unit I.
GDATA(I,13)	Northing coordinate for the current fire planning center for Unit I.
GDATA(I,14)	Current time in seconds
GDATA(I,15)	Time Unit I entered State 4. If Unit I is not in State 4, this entry is 0.
GDATA(I,16)	<p>Bit indicating the engagement status for Unit I. This entry can have value 1 or 0 with the following significance:</p> <p style="margin-left: 40px;">0 - Not currently engaged 1 - Currently engaged</p> <p>A unit is declared to be engaged in the event a target of opportunity originated by the unit is being processed. Accordingly, only units 1-4 can become engaged.</p>
GDATA(I,17)	Easting coordinate of the geometric center of the front line for Unit I.
GDATA(I,18)	Time Unit I became engaged. If the unit is not engaged, this entry has no significance.
GDATA(I,19)	Initial distance to current Unit I objective.
GDATA(I,20)	If the current Unit I objective is a portion of the next higher unit objective, this entry has a value of 1. Otherwise, the value is 0.

Tab 2

APPENDIX A

ARDATA TABLE

This table contains all the information pertaining to each of the artillery units in the model with the exception of the reinforcing artillery unit. This table is dimensioned 4x7x16. Table entries have the following significance:

ARDATA(I,J,1)	Weapon designator for the Jth weapon in Battery I. I takes on values 1,3. J takes on values 1,6.
ARDATA(I,7,2)	Current state of Battery I. If the battery is not engaged, this entry has value 1. If the battery is engaged, the value is 2. If the battery is moving, the value is 3.
ARDATA(I,J,3)	The easting coordinate for the actual location of the Jth weapon in Battery I.
ARDATA(I,J,4)	The northing coordinate for the actual location of the Jth weapon in Battery I.
ARDATA(I,7,3)	The easting coordinate of the actual geometric center of the weapons in Battery I.
ARDATA(I,7,4)	The northing coordinate of the actual geometric center of the weapons in Battery I.
ARDATA(I,7,6)	Azimuth of lay for the Ith Battery. The azimuth of lay is defined as the clockwise angle measured in radians from true North to the base direction for the weapons. The weapons are positioned about a line perpendicular to the azimuth of lay running through the battery center.

ARDATA(I,7,7)	Easting coordinate of the location assigned to the Ith Battery as its next position area.
ARDATA(I,7,8)	Northing coordinate of the location assigned to Battery I as its next position area.
ARDATA(I,7,9)	Current position error in easting for the Ith Battery. This component is computed using the relation: $\text{ARDATA(I,7,9)} = \text{ARDATA(L,7,3)} - \text{ARDATA(I,7,7)}$
ARDATA(I,7,10)	Current position error in northing for the Ith Battery. The relation used to compute this is: $\text{ARDATA(I,7,10)} = \text{ARDATA(I,7,4)} - \text{ARDATA(I,7,8)}$
ARDATA(I,7,13)	Cumulative rounds fired by Battery I.
ARDATA(I,7,14)	If Battery I is engaged this entry gives the priority rating of the target being engaged. The ratings are: 1 - Target of Opportunity 2 - Preparatory Target 3 - Scheduled Target 4 - On-Call Target

Note: Table entries not identified above are open storage locations and as such have no preassigned meaning.

Tab 3

APPENDIX A

TGT TABLE

This table contains all the information pertaining to each target in the model from the time the target is generated until action is completed on the target. The table is dimensioned 250x40. Each of the table entries is identified as follows:

TGT(I,1)	Target number assigned to the Ith target.
TGT(I,2)	Maneuver element generating the requirement for fire.
TGT(I,3)	Actual easting coordinate of the target.
TGT(I,4)	Actual northing coordinate of the target.
TGT(I,5)	If the target is a scheduled target, this entry is 1. Otherwise, the entry is 0.
TGT(I,6)	If the target is an on-call target, this entry is 1. Otherwise, the entry is 0.
TGT(I,7)	If the target is a preparatory target, this entry is 1. Otherwise, the entry is 0.
TGT(I,8)	Time the target is scheduled (applies only in the case of the scheduled or preparatory target).
TGT(I,9)	If the target is a target of opportunity, this entry is 1. Otherwise, the entry is 0.
TGT(I,10)	Time the target was originated.

TGT(I,11)	Artillery unit having responsibility for this target. If the target is a prep or scheduled target, the unit scheduled to fire is entered here. If the target is a target of opportunity, the entry is 4 representing the battalion. If supporting artillery is used, the entry is 100.
TGT(I,12)	Time the mission was completed.
TGT(I,13)	Cumulative rounds expended on this target.
TGT(I,14)	Casualties inflicted on this target.
TGT(I,15-17)	Artillery battery capability description indicator. A value of 1 indicates a battery is in range, a 0 indicates a battery is not in range. Batteries are listed in numerical order in cells 15-17.
TGT(I,18)	Total number of units in range of the target.
TGT(I,20)	If the target is a scheduled or preparatory target, this entry is the row number in the event list (EVLIST) which corresponds to the target engagement event.
TGT(I,21)	Easting component of target location error.
TGT(I,22)	Northing component of target location error.
TGT(I,23)	Category of the target for targets of opportunity. If target is not of this type, the entry is insignificant.
TGT(I,24)	Length of the target measured in meters.
TGT(I,25)	Depth of the target measured in meters.
TGT(I,26)	Number of individual target elements.
TGT(I,27)	Target density measured in elements per square meter of target area.

TGT(I,28)	For a target of opportunity, this entry is the identifier for the adjusting artillery unit. Otherwise, the entry is insignificant.
TGT(I,29)	Initial engagement range from the adjusting unit to the adjusting point.
TGT(I,30)	Number of volleys fired in the adjusting phase.
TGT(I,31)	Strategy used in the fire for effect phase.
TGT(I,32)	Number of volleys fired in the fire for effect phase.
TGT(I,33)	Percent casualties inflicted.
TGT(I,34)	Rounds per casualty inflicted.
TGT(I,35)	The total engagement time measured in seconds.
TGT(I,36)	The kill rate measured in casualties per second of engagement.
TGT(I,37)	Time the engagement began.
TGT(I,38)	Information bit for the first volley in the fire for effect phase. This entry is 1 if the current volley is the initial volley. Otherwise, the entry is 0.
TGT(I,39)	This entry has significance only in the case where the target is either a scheduled or preparatory target. When the target is planned, this entry has value 1. When firing responsibility has been determined, this entry is 0.

Note: Storage areas not identified explicitly above are open storage areas.

Tab 4

APPENDIX A

PRDATA TABLE

PRDATA is a four-dimensional table (3x7x20x10) which is the storage medium for the probability distributions corresponding to discrete random variables and the distribution parameters for the continuous variables. PRDATA is divided into three sub-tables.

Table entries for each of the tables are identified as follows:

TABLE 1

<u>Name</u>	<u>Note</u>	<u>Description</u>
PRDATA(1,I,2,1-4)	1	Parameters for the truncated normal distribution corresponding to the length of the front line for Unit I.
PRDATA(1,I,3,1-4)	1	Parameters for the truncated normal distribution corresponding to the objective distance in meters for Unit I.
PRDATA(1,I,4,1-4)	1	Parameters for the truncated normal distribution corresponding to the length of the objective major axis for Unit I.
PRDATA(1,I,5,1-4)	1	Parameters for the truncated normal distribution corresponding to the length of the objective minor axis for Unit I.
PRDATA(1,I,6-1-8)		Probability mass points corresponding to the discrete random variable representing the number of targets Unit I will plan during the fireplanning process while in fireplanning State 1.

PRDATA(1,I,7,1-8)		Same as PRDATA(1,I,6,1-8) except the information pertains to fireplanning State 2.
PRDATA(1,I,8,1-3)		Probability a target planned by Unit I in fireplanning State 1 will fall in one of the follow- ing categories: 1 - Preparatory 2 - Scheduled 3 - On-Call
PRDATA(1,I,9,1-3)		Same as PRDATA(1,I,8,1-3) except the appropriate fireplanning state is State 2.
PRDATA(1,I,10,1-3)		Given that a target planned by Unit I in fireplanning State 1 is a preparatory target, the probability that the target is located: 1 - On the objective 2 - Between LD and objective 3 - Beyond the objective
PRDATA(1,I,11,1-3)		Same as PRDATA(1,I,10,1-3) except that the fireplanning state is State 2.
PRDATA(1,I,12,1-3)		Same as PRDATA(1,I,10,1-3) except the target type is scheduled.
PRDATA(1,I,13,1-3)		Same as PRDATA(1,I,11,1-3) except the target type is scheduled.
PRDATA(1,I,14,1-3)		Same as PRDATA(1,I,10,1-3) except the target type is on-call.
PRDATA(1,I,15,1-3)		Same as PRDATA(1,I,11,1-3) except the target type is on-call.
PRDATA(1,I,16,1-2)	2	The lower and upper bounds for the uniform variate representing the movement rate for Unit I.

PRDATA(1,I,17,1-4)	3	The parameters for the truncated normal distribution corresponding to the lateral displacement of the objective of Unit I from the unit center line.
PRDATA(1,I,18,1-8)		Values for the discrete random variables representing the number of targets Unit I plans during the fireplanning process when the unit is in fireplanning State 1. These entries correspond to the probability mass values stored in PRDATA(1,I,6,1-8)
PRDATA(1,I,19,1-8)		Same as PRDATA(1,I,18,1-8) except the data pertains to fireplanning State 2. These entries correspond to the probability mass values stored in PRDATA(1,I,7,1-8)

TABLE 2

PRDATA(2,1,4,1-4)	3	The parameters for the truncated normal distribution corresponding to the lateral displacement of the position area for an artillery battery about the center line of the supported unit.
PRDATA(2,1,5,1-4)	4	The parameters for the truncated normal distribution corresponding to the depth displacement of an artillery unit behind the front line of the supported unit.
PRDATA(2,1,6,1-4)	1	Parameters for the truncated normal distribution corresponding to the movement rate in kilometers/hour for an artillery battery.
PRDATA(2,1,8,1-4)	1	Parameters for the truncated normal distribution corresponding to the emplacement time for an artillery battery measured in seconds.

PRDATA(2,1,9,1-4)	5	Parameters for the truncated normal distribution corresponding to the component error in easting and northing between the assigned location for the unit and the actual occupied location.
PRDATA(2,I,10,1-4)	6	The lower and upper bounds for the uniform variate corresponding to the coordinates of weapon 1 in Battery I. The coordinates are measured in the coordinate system with origin at the battery center and positive y axis aligned along the assigned azimuth of lay for the battery.
PRDATA(2,I,11-15,1-4)	6	Same as PRDATA(2,I,10,1-4) except the information pertains to weapons 2-6 in Battery I.
PRDATA(2,4,2,1-4)	1	Parameters for the truncated normal distribution corresponding to the time required for the forward observer to prepare a request for fire for a target of opportunity. The time increment is measured in seconds.
PRDATA(2,4,3,1-4)	1	Same as above except the time increment is the time measured in seconds for the forward observer to transmit the request for fire to the Fire Direction Center.
PRDATA(2,4,4,1-4)	1	Same as above except the time increment is the target analysis time in the Fire Direction Center. During this time period, the target is analyzed and units are selected to engage and/or adjust when appropriate.
PRDATA(2,1,5,1-4)	1	Same as above except the time increment is the time required for an adjusting unit to prepare and fire a volley in adjustment.

PRDATA(2,1,6,1-4)	1	Same as above except the time increment is the time required for the forward observer to make adjustment corrections and transmit them to the Fire Direction Center.
PRDATA(2,1,7,1-4)	1	Same as above. Time increment is the time required for the FDC to compute new adjusting data and transmit to the adjusting unit.
PRDATA(2,1,8,1-4)	1	Same as above except the time increment is that time required for the FDC to select a mass point in the fire for effect phase, compute the data, and send the data to the firing units.
PRDATA(2,1,9,1-4)	1	Same as above except the time increment is the time required for firing a unit to prepare and fire a volley in the fire for effect phase when the firing data is the same as that for the previous round.
PRDATA(2,4,10,1-4)	1	Same as above except the time increment is that time required for a firing unit to prepare and fire a volley in the fire for effect phase when the firing data has been changed.
PRDATA(2,4,11,1-4)	1	Same as above except the time increment is the time required for the reinforcing artillery unit to engage a target of opportunity.
PRDATA(2,4,12,1-4)	1	Same as above except the time increment is the time required for the reinforcing artillery unit to shoot a scheduled target.
PRDATA(2,4,13,1-4)	1	Same as above except the time increment is the time required for the reinforcing artillery unit to shoot a preparatory target.

PRDATA(2,5,2,1-4)	7	Parameters for the truncated normal distribution corresponding to the deflection deviation error in target location for a target of opportunity.
PRDATA(2,5,3,1-4)	7	Parameters for the truncated normal distribution corresponding to the range error in target location for a target of opportunity.
PRDATA(2,5,4,1-4)	7	Parameters for the truncated normal distribution corresponding to the deflection error in burst location sensing by the forward observer.
PRDATA(2,5,5,1-4)	7	Parameters for the truncated normal distribution corresponding to the range error in burst location sensing by the forward observer.

TABLE 3

PRDATA(3,1,1,1-4)	1	Parameters for the truncated normal distribution corresponding to the lateral length in meters for a Category I target.
PRDATA(3,1,2,1-4)	1	Parameters for the truncated normal distribution corresponding to the depth of Zone 1 in meters for a Category I target.
PRDATA(3,1,3,1-4)	1	Same as PRDATA(3,1,2,1-4) except the zone is Zone 2.
PRDATA(3,1,4,1-4)	1	Same as PRDATA(3,1,2,1-4) except the zone is Zone 3.
PRDATA(3,1,5,1-4)	1	Same as PRDATA(3,1,1,1-4) except the target is a Category II target.
PRDATA(3,1,6,1-4)	1	Same as PRDATA(3,1,2,1-4) except the data is for a Category II target.

PRDATA(3,1,7,1-4)	1	Same as PRDATA(3,1,3,1-4) except the data is for a Category II target.
PRDATA(3,1,8,1-4)	1	Same as PRDATA(3,1,4,1-4) except the data is for a Category II target.
PRDATA(3,1,9,1-2)	2	The lower and upper bounds on the uniform variate representing the number of target elements in a target of Category I.
PRDATA(3,1,10,1-2)	2	Same as PRDATA(3,1,9,1-2) except the data pertains to a Category II target.
PRDATA(3,1,11,1)		Probability that a random target is a Category I target.
PRDATA(3,2,J,1-2)		The length and width of the aimpoint rectangle for Strategy J. J=2,8.
PRDATA(3,2,9,1-8)		The probability mass values associated with the selection of each of the strategies for a fire for effect mission.
PRDATA(3,2,10,1-8)		Probability mass values corresponding to the values of the discrete random variable representing the number of volleys in fire for effect for an adjustment mission.
PRDATA(3,2,11,1-8)		The values of the discrete random variable corresponding to the mass function in PRDATA(3,2,10,1-8).
PRDATA(3,2,12,1-8)		Same as PRDATA(3,2,10,1-8) except for the scheduled type target.
PRDATA(3,2,13,1-8)		Same as PRDATA(3,2,11,1-8) except for the scheduled type target.

PRDATA(3,2,14,1-8)

Same as PRDATA(3,2,9,1-8)
except the type target is
scheduled.

NOTES

- 1 - Data is entered in the following order: mean, variance, lower bound, upper bound.
- 2 - Data is entered in the following order: lower bound, upper bound.
- 3 - The lower bound and the upper bound correspond to the lateral boundaries of the maneuver element involved.
- 4 - The lower bound is a point a distance equal to the maximum range behind the fireplanning center of the supported unit. The upper bound is the supported unit fireplanning center.
- 5 - The lateral bounds on the easting component of error are the same as in Note 3. The bounds on the northing component are as described in Note 4.
- 6 - Data is entered in the following order: lower bound on y coordinate, upper bound on y coordinate, lower bound on x coordinate, upper bound on x coordinate.
- 7 - In each case, the distribution mean is 0 and the variance is a linear function of the appropriate distance. Data is entered in the following order: a, b, c, d where

a = Intercept of the linear function $\text{Var} = a + b(\text{dist})$

b = Slope of the above function

c = 0

d = Absolute value of upper bound on the error component

Tab 5

APPENDIX A

MISCELLANEOUS

Descriptions of the principal miscellaneous variables in the model are:

<u>Name</u>	<u>Description</u>
ITGT	Target number of the last target generated at any particular point in time.
IROW	The row number of the current event in the event list.
CTIME	Current time.
TINC,TOPT,SHOUR	General purpose time variables.
J100,J200	General purpose counting variables.
EXMN	The mean intergeneration times for targets of opportunity. This increment is exponentially distributed.
XLETH	The parameter "g" in the general lethality function

$$f(x) = e^{-\frac{x^2}{2g}}$$

where "x" is the radial miss distance and f(x) is the probability a target element located a distance "x" away from the burst point becomes a casualty.

XTLETH	General purpose variable.
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NU	The current seed for the random number generator.
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FD105(I,J,K)	<p>The ballistic firing parameters. I refers to charge, J is the range increment, and K indexes the type data, i.e.,</p> <ul style="list-style-type: none"> 1 - Range Probable Error 2 - Deflection Probable Error 3 - Time of Flight
SUP(I)	General storage for information pertaining to the reinforcing artillery unit.
RMAX	The maximum range of the artillery weapons.
NGUNS	Number of guns in the artillery batteries. This is preset at value of 6.
Q(I)	Current length of each of the queues.
QUES(I,J,K)	Temporary storage area for event vectors corresponding to targets in queue.
NCHGS	The number of charges available.
NRINC	The number of range increments for the ballistic data.
STAT(I,1)	Cumulative queue length for queue I.
STAT(I,2)	Number of times the queue length has been sampled for queue I.
STAT(I+4,1)	Cumulative time spent in queue I for targets entering queue I.
STAT(I+4,2)	Number of targets entering queue I.
STAT(9,1)	Cumulative number of casualties inflicted on targets of opportunity.
STAT(9,2)	Cumulative engagement time for targets of opportunity.
STAT(10,1)	Cumulative rounds fired on target of opportunity.
STAT(10,2)	Cumulative number of casualties inflicted on targets of opportunity.

APPENDIX B

Model Input Parameters

Model input parameters must be arranged in accordance with this appendix.

<u>Card #</u>	<u>Columns</u>	<u>Type/Format</u>	<u>Description</u>
1	1-10	F10.2	Distribution mean for the random variable (r.v.) of front line length for a company size element.
	11-20	F10.2	Distribution variance for front line length for a company size element.
	21-30	F10.2	Lower bound on front line length for a company size element.
	31-40	F10.2	Upper bound on front line length for company size element.
2	1-10	F10.2	Distribution mean for the r.v. representing the objective distance for a company size element.
	11-20	F10.2	Variance for objective distance for company size element.
	21-30	F10.2	Blank
	31-40	F10.2	Upper bound on objective distance for company size element.
3	1-10	F10.2	Distribution mean for the r.v. representing the length of the major axis of the unit objective for a company size element.
	11-20	F10.2	Variance in length of objective major axis for company size element.

3	21-30	F10.2	Lower bound on length of objective major axis for company size element.
	31-40	F10.2	Upper bound on length of objective major axis for company size element
4	1-10	F10.2	Distribution mean for r.v. representing the length of the minor axis for a company size objective.
	11-20	F10.2	Variance in length of minor axis for a company size objective.
	21-30	F10.2	Lower bound on length of the objective minor axis for company size element.
	31-40	F10.2	Upper bound on length of objective minor axis for company size element.
5-8	1-40	4F10.2	Same information as on cards 1-4 except for the appropriate unit size is battalion.
9-12	1-40	4F10.2	Same information as on cards 1-4 except unit is brigade size.
13	1-10	F10.2	Lower bound on the r.v. representing the company movement rate expressed in kilometers/hour.
	11-20	F10.2	Upper bound on company movement rate.
14	1-10	F10.2	Distribution variance for the r.v. representing the deviation of the location of the objective center about the unit center line in easting. Data is for a company size element.
	11-20	F10.2	Same as for columns 1-10 except that the data is for a battalion size element.

14	21-30	F10.2	Same as for columns 1-10 except the appropriate unit size is brigade.
15	1-80	8F10.2	Values of the discrete r.v. representing the number of targets a company size element will plan while conducting fireplanning in fireplanning state 1. Eight values may be entered.
16	1-80	8F10.2	Probability mass associated with each of the values entered on card 15.
17	1-80	8F10.2	Same information as card 15 except the appropriate unit fireplanning state is state 2.
18	1-80	8F10.2	Same as card 16 except the fireplanning state is state 2.
19	1-10	F10.2	Probability that a randomly selected target planned by a company size element in fireplanning state 1 is a preparatory target.
	11-20	F10.2	Probability that a randomly selected target planned by a company size element in fireplanning state 1 is a scheduled, non-preparatory target.
	21-30	F10.2	Probability that a randomly selected target planned by a company size element in fireplanning state 1 is an on-call target.

Note: Entries must sum to 1.0

20	1-30	3F10.2	Same as card 19 except that the fireplanning state is fireplanning state 2.
21	1-10	F10.2	Probability that a randomly selected company planned preparatory target, planned in fireplanning state 1, is located on the company objective.

	11-20	F10.2	Same as columns 1-10 except that the location category is between the LD and the objective.
21	21-30	F10.2	Same as columns 1-10 except that the location category is beyond the objective.
22	1-30	3F10.2	Same information as on card 21 except that the fireplanning state is state 2.
23	1-30	3F10.2	Same as card 21 except that the target is a scheduled, non-preparatory target, and the fireplanning state is state 1.
24	1-30	3F10.2	Same as card 21 except that the target is a scheduled, non-preparatory target, and the fireplanning state is state 2.
25	1-30	3F10.2	Same as card 21 except that the target is an on-call target and the fireplanning state is state 1.
26	1-30	3F10.2	Same as card 21 except that the target is an on-call target and the fireplanning state is state 2.
27-38	1-80	8F10.2	Same as cards 15-26 except that the unit size is battalion.
39-50	1-80	8F10.2	Same as cards 15-26 except that the unit size is brigade.
51	1-10	F10.2	Blank
	11-20	F10.2	Distribution variance for the r.v. representing the deviation of the location of the battery assigned position in easting about the supported unit center line.
	21-80		Blank

52	1-10	F10.2	Distribution mean for the r.v. representing the distance of the assigned battery center behind the front line of the supported unit.
	11-20	F10.2	Variance in the distance of the assigned battery center behind the front line.
53	1-10	F10.2	Distribution mean for the random variable representing the time required for the battery to march order, measured in seconds.
	11-20	F10.2	Distribution variance for battery march order time.
	21-30	F10.2	Lower bound on battery march order time, measured in seconds.
	31-40	F10.2	Upper bound on battery march order time measured in seconds.
54	1-10	F10.2	Distribution mean for the r.v. representing the battery movement rate, measured in kilometers/hour.
	11-20	F10.2	Distribution variance for the battery movement rate.
	21-30	F10.2	Lower bound on the battery movement rate.
	31-40	F10.2	Upper bound on the battery movement rate.
55	1-10	F10.2	Distribution mean for the r.v. representing the time required for the artillery battery to emplace its weapons. The time is measured in seconds.
	11-20	F10.2	Variance in battery emplacement time.
	21-30	F10.2	Lower bound on battery emplacement time.

	31-40	F10.2	Upper bound on battery emplacement time.
56	1-10	F10.2	Blank
	11-20	F10.2	Distribution variance for the r.v. representing the magnitude of the x and y components of error in locating the battery position center.
	21-30		Blank
	31-40	F10.2	Upper bound on the x and y components of error.
57	1-10	F10.2	Lower bound on the r.v. representing the y coordinate of weapon number 1 in the coordinate system with origin at the battery geometrical center and the positive y axis as the direction of fire.
	11-20	F10.2	Upper bound on the r.v. representing the y coordinate of weapon number 1.
	21-30	F10.2	Lower bound on the r.v. representing the x coordinate of weapon number 1 in the coordinate system previously described.
	31-40	F10.2	Upper bound on the r.v. representing the x coordinate of weapon number 1.
58	1-40	4F10.2	Same information as card 57 except the data pertains to weapon number 2.
59	1-40	4F10.2	Same information as card 57 except the data pertains to weapon number 3.
60	1-40	4F10.2	Same information as card 57 except the data pertains to weapon number 4.

61	1-40	4F10.2	Same information as card 58 except the data pertains to weapon number 5.
62	1-40	4F10.2	Same information as card 57 except the data pertains to weapon number 6.
63	1-10	F10.2	Distribution mean for the r.v. representing the time required for the forward observer to prepare a fire mission request for a target of opportunity. Time is measured in seconds.
	11-20	F10.2	Distribution variance for the above.
	21-30	F10.2	Lower bound on the time required for the forward observer to prepare a fire mission request, measured in seconds.
64	1-40	4F10.2	Same as for card 63 except that the time increment is the time required for the forward observer to transmit the request for fire to the Fire Direction Center. The increment is measured in seconds.
65	1-40	4F10.2	Same as card 63 except the time increment is the time required to analyze the target, select units to engage the target, and select a unit to adjust.
66	1-40	4F10.2	Same as card 63 except that the time increment is the time required for the adjusting unit to prepare and fire a volley in adjustment.
67	1-40	4F10.2	Same as card 63 except the time increment is the time required for the forward observer to determine the adjustment corrections and forward them to the fire direction center.

68	1-40	4F10.2	Same as card 63 except the time increment is the time required for the fire direction center to compute adjustment corrections and transmit new firing data to the adjusting unit.
69	1-40	4F10.2	Same as card 63 except the time increment is the time required for the fire direction center to select a mass point, compute the firing data, and transmit the fire commands to the firing units.
70	1-40	4F10.2	Same as card 63 except the time increment is the time required for the firing unit to prepare and fire a volley in the fire for effect phase when the firing data is different from that used for the previous volley.
71	1-40	4F10.2	Same as card 63 except the time increment is the time required for a firing unit to prepare and fire a volley in the fire for effect phase when the firing data has not changed.
72	1-40	4F10.2	Same as card 63 except the time increment is the time required for the reinforcing artillery unit to conduct an engagement of a target of opportunity.
73	1-40	4F10.2	Same as card 63 except the time increment is the time required for the reinforcing artillery unit to conduct an engagement of a scheduled target.
74	1-40	4F10.2	Same as card 65 except the time increment is the time required for the reinforcing artillery unit to conduct an engagement of a preparatory target.
75	1-10	F10.2	Intercept for the linear function representing the distribution variance for the deviation component of target location error.

	11-20	F10.2	Slope for the above function.
	21-30	F10.2	Blank
	31-40	F10.2	The upper bound on the deviation error described above.
76	1-40	4F10.2	Same as card 75 except the data is for the range component of target location error.
77	1-40	4F10.2	Same as card 75 except the data is for the deviation component of burst location error.
78	1-40	4F10.2	Same as card 75 except data is for the range component of burst location error.
79	1-10	F10.2	Width of fire for effect rectangle corresponding to fire for effect strategy 2.
	11-20	F10.2	Depth of fire for effect rectangle above.
<p>Note: Strategy 1 is defined internally in the model and corresponds to that strategy which specifies that each volley in the fire for effect phase is fired at the adjusted target location or the reported target location as appropriate for the mission.</p>			
80	1-20	2F10.2	Same as card 79 except the information pertains to strategy 3.
81	1-20	2F10.2	Same as card 79 except the information pertains to strategy 4.
82	1-20	2F10.2	Same as card 79 except the information pertains to strategy 5.
83-85	1-20	2F10.2	Same as card 79 except the information pertains to strategies 6-8.
86	1-80	8F10.2	Probability mass values corresponding to the adoption of each of the 8 attach strategies when firing for effect on a target of opportunity.

87	1-80	8F10.2	Values of the discrete random variables corresponding to the number of volleys to be fired in effect when a target of opportunity is being engaged.
88	1-80	8F10.2	Probability mass values corresponding to each of the values described for card 87.
89	1-80	8F10.2	Values of the discrete random variable corresponding to the number of volleys to be fired in effect when a scheduled target is being engaged.
90	1-80	8F10.2	Probability mass values corresponding to each of the values described for card 89.
91	1-80	8F10.2	Probability mass values corresponding to the adoption of each of the 8 attack strategies when firing for effect on a scheduled target.
92	1-10	I10	The number of charges for which ballistic firing data is to be entered.
	11-20	I10	The number of range increments to be used. Each range increment is assigned a value of 500 meters.
93	1-10	F10.2	Maximum effective range for the artillery weapon being considered. Must equal the number of range increments times 500.
94-N	1-80	8F10.2	See Block Description below.

BLOCK DESCRIPTION: The weapon ballistic firing parameters are input in this block of data. The data is organized into sub-blocks by charge. Data within each sub-block is entered in the following order: range probable errors, deflection probable errors, and last, time of flight. For each category, i.e., probable errors, etc., exactly NRINC data points must be provided. In the event that some particular charge cannot achieve a range greater than, say, ROTO, then enter the value 1000. For each

range probable error entry after the entry corresponding to RTOT, a value of 0 suffices for the entry corresponding to deflection probable error and time of flight.

N+1	1-10	I10	The seed for the random number generator.
	11-20	I10	Enter the value 6.
N+2	1-10	I10	Probability that a random target is of size category I.
N+3	1-10	F10.2	Distribution mean for the random variable representing the lateral length of a target of size category I. The data is entered in meters.
	11-20	F10.2	The distribution variance for the above.
	21-30	F10.2	Lower bound on the lateral length of target of size category I.
	31-40	F10.2	Upper bound on the lateral length of target of size category I.
N+4	1-40	4F10.2	Same information as card N+3 except the data pertains to the depth of Zone 1 for a Category I target.
N+5	1-40	4F10.2	Same as card N+3 except the data is for Zone 2.
N+6	1-40	4F10.2	Same as card N+3 except the data is for Zone 3.
(N+7)-(N+10)	1-40	4F10.2	Same as cards (N+3)-(N+6) except data pertains to Category II target.
N+11	1-10	F10.2	Lower bound on the number of target elements in a target of Category I.
	11-20	F10.2	Upper bound on the number of target elements in a target of Category I.

N+12	1-20	2F10.2	Same as card N+11 except the data applies to a target in Category II.
------	------	--------	---

A sample input deck is shown in the attachment hereto.

SAMPLE DATA DECK

[illegible]

.6	3	1			
.2	2	.8			
.6	1	.7			
1000.	3	1	8000000.		
600.	20000.	400.	400.		
20.	6000.	10.	30.		
360.	400.	300.	1200.		
10.	9000.	-50.	-150.		
-10.	10.	-30.	-30.		
10.	10.	-10.	-10.		
-10.	10.	30.	10.		
10.	10.	50.	30.		
30.	500.	25.	50.		
60.	500.	15.	75.		
25.	500.	50.	45.		
20.	500.	20.	70.		
30.	500.	15.	35.		
60.	500.	15.	35.		
15.	500.	20.	45.		
1200.	500.	120.	40.		
800.	300.	50.	70.		
1900.	15.	15.	15.		
300.	200.	1000.	1400.		
2000.	800.	1700.	1100.		
2000.	03	200.	400.		
200.	3	500.	1000.		
200.	03	1000.	400.		
2500.	03				
400.	200.				
600.	300.				
150.	200.				
195.	200.				
400.	200.				
75.	25.				
.6	20.5				
.2	.8				
.6	3.				
.5	5				
.6	1.7				
.3	4				
11000.	22				
3.	6.				
	8.				
	10.				
	12.				
	15.				
	17.				

20. 1000. 0. 3.	24. 1000. 1. 3.	27. 1000. 1. 4.	1000. 1000. 1.	1000. 1000. 2.	1000. 1000. 2.	1000. 1000. 2.
1.9 20.8	3.9 24.3	5.9 29.1	8.1	10.3	12.6	15.1
4. 18. 1000. 0. 3.	5. 21. 1000. 1. 3.	6. 24. 1000. 1. 3.	8. 28. 1000. 1. 4.	9. 32. 1000. 1. 4.	11. 36. 1000. 2. 5.	13. 1000. 1000. 2.
1.7 17.2	3.4 19.6	5.2 22.2	7.0 25.1	8.9 28.5	10.8 33.0	12.8
5. 12. 28. 0. 3. 6.	5. 13. 31. 1. 3. 7.	6. 15. 1000. 1. 3.	7. 17. 1000. 1. 4.	8. 19. 1000. 1. 4.	9. 21. 1000. 2. 4.	10. 23. 1000. 2. 5.
1.4 15.0 35.5	2.9 17.0 41.4	4.5 19.0	6.1 21.2	7.8 23.5	9.5 26.0	11.3 28.7
8. 11. 16. 0. 3. 5.	8. 11. 17. 1. 3. 6.	8. 12. 18. 1. 3. 6.	8. 13. 19. 1. 4. 7.	8. 13. 20. 1. 4. 7.	9. 14. 21. 2. 4. 9.	10. 14. 1000. 2. 5.
1.12 29.1	2.3 14.7 31.7	3.6 16.5 34.5	4.9 18.4 37.7	6.4 20.4 41.6	8.0 22.4 48.4	9.6 24.5
6 300. 100. 100. 50. 400. 65. 65. 65. 185. 60. 4800.	12371 300. 300. 300. 300. 1200. 300. 300. 300. 120.	6 100. 50. 50. 25. 300. 60. 60. 60.	400. 125. 125. 75. 500. 70. 70. 70.			

Blank

APPENDIX C

Model Output

Extracts of the output for a sample computer run are attached as a tab hereto. The output report is organized according to the following scheme:

Part I Input Parameters

- Section I Maneuver Element Parameters
- Section II Fireplanning Parameters
- Section III Artillery Unit Parameters
- Section IV Fire Mission Processing Parameters
- Section V Target Characteristic Parameters
- Section VI Target Attack Strategy Parameters
- Section VII Artillery Ballistic Data
- Section VIII Burst Lethality Data

Part II Initial Situation

- Section I Initial Maneuver Element Dispositions
- Section II Initial Artillery Unit Dispositions

Part III Initial Fire Plan

Part IV Run Results

- Section I Event Vector Listing
- Section II Targets of Opportunity Engaged
- Section III Scheduled and Preparatory Targets Engaged
- Section IV Reinforcing Unit Targets
- Section V Summary Data

SECTION 1

BASIC MANUEVER ELEMENT PARAMETERS

DESCRIPTION	TYPE OF DISTRIBUTION	MEAN	VARIANCE	LOWER LIMIT	UPPER LIMIT
BRIGADE DATA					
WIDTH OF FRONT	TRUNCATED NORMAL	12000.00	20000.00	10000.00	14000.00
DISTANCE TO OBJECTIVE	TRUNCATED NORMAL	30000.00	30000.00	0.0	40000.00
LENGTH OF CPJ MAJ AXIS	TRUNCATED NORMAL	2500.00	25000.00	1800.00	3200.00
LENGTH OF CPJ MIN AXIS	TRUNCATED NORMAL	1250.00	25000.00	1000.00	1500.00
MOVEMENT RATE (KM/HR)	UNIFORM			2.00	4.00
LATERAL DISPLACEMENT OF UNIT OBJECTIVE ABOUT UNIT CENTER LINE	TRUNCATED NORMAL	0.0	25000.00	SEE NOTE	
BATTALION DATA					
WIDTH OF FRONT	TRUNCATED NORMAL	4000.00	56000.00	2100.00	10000.00
DISTANCE TO OBJECTIVE	TRUNCATED NORMAL	10000.00	28000.00	0.0	15000.00
LENGTH OF CPJ MAJ AXIS	TRUNCATED NORMAL	1000.00	5000.00	500.00	1500.00
LENGTH OF CPJ MIN AXIS	TRUNCATED NORMAL	750.00	5000.00	500.00	1000.00
MOVEMENT RATE (KM/HR)	UNIFORM			2.00	4.00
LATERAL DISPLACEMENT OF UNIT OBJECTIVE ABOUT UNIT CENTER LINE	TRUNCATED NORMAL	0.0	25000.00	SEE NOTE	
COMPANY DATA					
WIDTH OF FRONT	TRUNCATED NORMAL	3000.00	28000.00	1000.00	5000.00
DISTANCE TO OBJECTIVE	TRUNCATED NORMAL	6000.00	28000.00	0.0	8000.00
LENGTH OF CPJ MAJ AXIS	TRUNCATED NORMAL	500.00	5000.00	200.00	800.00
LENGTH OF CPJ MIN AXIS	TRUNCATED NORMAL	250.00	500.00	200.00	400.00
MOVEMENT RATE (KM/HR)	UNIFORM			2.00	4.00
LATERAL DISPLACEMENT OF UNIT OBJECTIVE ABOUT UNIT CENTER LINE	TRUNCATED NORMAL	0.0	25000.00	SEE NOTE	

NOTES

- (1) ALL DISTANCE MEASURE POINTS ARE IN METERS
 (2) VALUES OF THE LATERAL DISPLACEMENT OF THE UNIT OBJECTIVES
 ARE FUNCTIONS OF THE RESPECTIVE UNIT LEFT AND RIGHT BOUNDARIES

FIREPLANNING PARAMETERS

BRIGADE DATA

FIREPLANNING STATE 1

VALUES FOR NUMBER OF TARGETS UNIT WILL PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A PREPARATORY TARGET, SCHEDULED TARGET OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 2.00 2.00 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.0 0.50 0.50 0.0 0.0 0.0 0.0 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.20 0.10 0.70 0.0 0.0 0.0 0.0 0.0

FIREPLANNING STATE 2

VALUES FOR NUMBER OF TARGETS UNIT WILL PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A PREPARATORY TARGET, SCHEDULED TARGET OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 2.00 2.00 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.20 0.30 0.50 0.0 0.0 0.0 0.0 0.0

0.80 0.20 0.10 0.0 0.0 0.0 0.0 0.0

0.0 0.20 0.90 0.0 0.0 0.0 0.0 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

FIREPLANNING STATE 1

VALUES FOR NUMBER OF TARGETS UNIT WILL PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A PREPARATORY TARGET, SCHEDULED TARGET OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 0.0 0.0 0.0 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.30 0.40 0.20

0.20 0.10 0.70

0.90 0.10 0.0

0.80 0.20 0.0

VALUES FOR NUMBER OF TARGETS UNIT WILL PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A PREPARATORY TARGET, SCHEDULED TARGET OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 0.0 0.0 0.0 0.0

0.80 0.10 0.10 0.0 0.0 0.0 0.0 0.0

0.40 0.30 0.30

0.80 0.10 0.10

0.50 0.30 0.10

0.60 0.30 0.10

FIREPLANNING STATE 1

VALUES FOR NUMBER OF TARGETS UNIT WILL
PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A
PREPARATORY TARGET, SCHEDULED TARGET
OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET
IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE
OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED
TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET
IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE
OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 0.0 0.0 0.0 0.0

0.20 0.20 0.20 0.20 0.20 0.05 0.05 0.10 0.0

0.10 0.60 0.30

0.30 0.60 0.10

0.10 0.60 0.30

0.60 0.30 0.20

FIREPLANNING STATE 2

VALUES FOR NUMBER OF TARGETS UNIT WILL
PLAN IN THE FIREPLANNING PROCESS

PROBABILITIES ASSOCIATED WITH THE ABOVE VALUES

PROBABILITY THAT A RANDOM TARGET IS A
PREPARATORY TARGET, SCHEDULED TARGET
OR AN ON CALL TARGET

PROBABILITY THAT A RANDOM PREPARATORY TARGET
IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE
OR BEYOND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM SCHEDULED
TARGET IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE

PROBABILITY THAT A RANDOM ON CALL TARGET
IS LOCATED ON THE UNIT OBJECTIVE, BETWEEN THE
LINE OF DEPARTURE (OR FEAR) AND THE UNIT OBJECTIVE
OR BEYOND THE UNIT OBJECTIVE

2.00 2.00 2.00 2.00 2.00 0.0 0.0 0.0 0.0

0.60 0.30 0.10 0.0 0.0 0.0 0.0 0.0

0.0 0.20 0.80

0.80 0.10 0.10

0.30 0.50 0.20

0.80 0.20 0.0

DESCRIPTION	TYPE OF DISTRIBUTION	MEAN	VARIANCE	LOWER LIMIT	UPPER LIMIT
BATTERY LATERAL DISPLACEMENT ABOUT THE CENTER LINE OF THE SUPPORTED UNIT	TRUNCATED NORMAL	0.0	0.0	SEE NOTES	
BATTERY DEPTH DISPLACEMENT BEHIND THE FRONT LINE OF THE SUPPORTED UNIT	TRUNCATED NORMAL	1000.00	20000.00	SEE NOTES	
MARCH ORDER TIME (SEC)	TRUNCATED NORMAL	600.00	6000.00	400.00	800.00
MOVEMENT RATE(KM/HRI	TRUNCATED NORMAL	20.00	400.00	10.00	30.00
UNIT EMPLOYMENT TIME (SEC)	TRUNCATED NORMAL	360.00	400.00	300.00	420.00
POSITION ERROR COMPONENT	TRUNCATED NORMAL	0.0	9000.00	SEE NOTE	

DISPERSION OF WEAPONS
UNIFORM DISTRIBUTIONS

WEAPON	DEPTH DISPERSION		LATERAL DISPERSION	
	LOWER LIMIT	UPPER LIMIT	LOWER LIMIT	UPPER LIMIT
1	10.0	10.0	-50.0	-50.0
2	-10.0	-10.0	-30.0	-30.0
3	10.0	10.0	-10.0	-10.0
4	10.0	10.0	10.0	10.0
5	-10.0	-10.0	30.0	30.0
6	10.0	10.0	50.0	50.0

NOTES

- (1) BOUNDS ON LATERAL DISPLACEMENTS ARE THE LATERAL BOUNDARIES OF THE SUPPORTED UNIT
- (2) BOUNDS ON THE DEPTH DISPLACEMENT ARE THE FRONT LINE AND A POINT MAX RANGE BEHIND THE FRONT LINE
- (3) LATERAL BOUNDS ON THE ERROR COMPONENT ARE FUNCTIONS OF THE ROUNDS IN (1) AND (2) ABOVE
- (4) DISTANCE MEASURES ARE IN METERS
- (5) TIME MEASURES ARE IN SECONDS

DESCRIPTION	TYPE OF DISTRIBUTION	MEAN	VARIANCE	LOWER LIMIT	UPPER LIMIT
TIME FOR THE FC TO PREPARE THE FIRE MISSION FOR A TARGET OF OPPORTUNITY	TRUNCATED NORMAL	50.00	500.00	25.00	75.00
TIME FOR THE FC TO TRANSMIT THE REQUEST FOR FIRE TO THE FCC	TRUNCATED NORMAL	30.00	500.00	15.00	45.00
TIME REQUIRED TO CONDUCT THE ANALYSIS OF THE TARGET	TRUNCATED NORMAL	60.00	500.00	50.00	70.00
TIME REQUIRED FOR THE ADJUSTING UNIT TO PREPARE AND FIRE A VOLLEY IN THE ADJUSTMENT	TRUNCATED NORMAL	25.00	500.00	20.00	35.00
TIME FOR THE FC TO MAKE ADJUSTMENT CORRECTIONS AND TRANSMIT THEM TO FCC	TRUNCATED NORMAL	20.00	500.00	15.00	35.00
TIME FOR FCC TO COMPUTE NEW ADJUSTING FIRING DATA AND TRANSMIT IT TO THE ADJUSTING UNIT	TRUNCATED NORMAL	30.00	500.00	15.00	45.00
TIME FOR FCC TO SELECT A MASS BULLET TO FIRE FOR EFFECT, PLEASE COMPUTE THE DATA AND TRANSMIT IT TO THE FIRING UNIT	TRUNCATED NORMAL	30.00	500.00	20.00	40.00
TIME REQUIRED FOR A FIRING UNIT TO PREPARE AND FIRE A VOLLEY IN FIRE FOR EFFECT WHEN THE DATA IS DIFFERENT FROM THAT USED IN THE PREVIOUS VOLLEY	TRUNCATED NORMAL	60.00	300.00	50.00	70.00
TIME REQUIRED FOR A FIRING UNIT TO PREPARE AND FIRE A VOLLEY IN FIRE FOR EFFECT WHEN THE FIRING DATA IS UNCHANGED	TRUNCATED NORMAL	15.00	0.0	15.00	15.00
TIME FOR THE WEINGORSTAL UNIT TO SIGHT A TARGET OF OPPORTUNITY	TRUNCATED NORMAL	1200.00	200.00	1000.00	1400.00
TIME FOR THE WEINGORSTAL UNIT TO SHOOT A SCHEDULED MISSION	TRUNCATED NORMAL	400.00	900.00	700.00	1100.00
TIME FOR REINTEGRATING UNIT TO SHOOT A PREPARED MISSION	TRUNCATED NORMAL	300.00	0.0	200.00	400.00

BASIC ERROR PARAMETERS
PARAMETERS FOR LINEAR FUNCTIONS REPRESENTING VARIANCE AS A FUNCTION OF RANGE

DESCRIPTION	INTERCEPT	SLOPE
EASTING COMPONENT OF TARGET LOCATION ERROR	200.0000	0.0300
NORTHING COMPONENT OF TARGET LOCATION ERROR	200.0000	0.3000
ELEVATION COMPONENT OF TARGET LOCATION ERROR	200.0000	0.0300
RANGE COMPONENT OF TARGET LOCATION ERROR	200.0000	0.0300

SECTION V

TARGET CHARACTERISTIC PARAMETERS

CATEGORY I TARGET

DESCRIPTION	DISTRIBUTION	LOWER LIMIT	UPPER LIMIT
NUMBER OF TGT ELEMENTS	UNIFORM	60.	120.
DEPTH OF ZONE 1	UNIFORM	100.	300.
DEPTH OF ZONE 2	UNIFORM	100.	300.
DEPTH OF ZONE 3	UNIFORM	50.	300.
LATERAL WIDTH	UNIFORM	300.	300.

CATEGORY II TARGET

DESCRIPTION	DISTRIBUTION	LOWER LIMIT	UPPER LIMIT
NUMBER OF TGT ELEMENTS	UNIFORM	185.	300.
DEPTH OF ZONE 1	UNIFORM	65.	300.
DEPTH OF ZONE 2	UNIFORM	65.	300.
DEPTH OF ZONE 3	UNIFORM	65.	300.
LATERAL WIDTH	UNIFORM	400.	1200.

SECTION VI ENGAGEMENT STRATEGIES

STRATEGY NUMBER	LENGTH	DEPTH
1	0.0	0.0
2	500.00	200.00
3	400.00	300.00
4	600.00	200.00
5	150.00	200.00
6	195.00	200.00
7	400.00	325.00
8	75.00	20.00

DISTRIBUTION OF NUMBER OF VOLLEYS IN THE FIRE FOR EFFECT PHASE FOR A TARGET OF OPPORTUNITY

NUMBER OF VOLLEYS	1.	2.	3.	4.	5.	6.	7.	8.
PROBABILITY	0.20	0.80	0.00	0.00	0.00	0.00	0.00	0.00

DISTRIBUTION OF NUMBER OF VOLLEYS IN THE FIRE FOR EFFECT PHASE FOR A SCHEDULED TARGET

NUMBER OF VOLLEYS	1.	2.	3.	4.	5.	6.	7.	8.
PROBABILITY	0.60	0.50	0.50	0.00	0.00	0.00	0.00	0.00

PROBABILITY DISTRIBUTION ON THE ATTACK STRATEGIES FOR A TARGET OF OPPORTUNITY

STRATEGY NUMBER	1	2	3	4	5	6	7	8
PROBABILITY	.60	.05	.05	.10	.05	.05	.05	.05

PROBABILITY DISTRIBUTION ON THE ATTACK STRATEGIES FOR A SCHEDULED TARGET

STRATEGY NUMBER	1	2	3	4	5	6	7	8
PROBABILITY	.30	.70	.00	.00	.00	.00	.00	.00

NOTES

LENGTH AND WIDTH FOR THE ATTACK STRATEGIES REFER TO THE DIMENSIONS OF THE BOX WHICH IS SUPERIMPOSED OVER THE TARGET AREA

SECTION VII
ARTILLERY BALLISTIC DATA

CHARGE 1

RANGE	PER	PED	TOF
500	3.00	0.0	1.90
1000	5.00	1.00	3.90
1500	6.00	1.00	5.90
2000	8.00	1.00	8.10
2500	10.00	1.00	10.30
3000	12.00	2.00	12.60
3500	15.00	2.00	15.10
4000	17.00	2.00	17.80
4500	20.00	3.00	20.90
5000	24.00	3.00	24.30
5500	27.00	4.00	29.10
6000	1000.00	0.0	0.0
6500	1000.00	0.0	0.0
7000	1000.00	0.0	0.0
7500	1000.00	0.0	0.0
8000	1000.00	0.0	0.0
8500	1000.00	0.0	0.0
9000	10000.00	0.0	0.0
9500	1000.00	0.0	0.0
10000	1000.00	0.0	0.0
10500	1000.00	0.0	0.0
11000	1060.00	0.0	0.0

NOTE: A PER EQUAL TO 1000. INDICATES THE RANGE IS NOT ACHIEVABLE WITH THIS CHARGE

RANGE	PER	PF3	TOF
500	4.00	0.0	1.70
1000	5.00	1.00	3.40
1500	6.00	1.00	5.20
2000	8.00	1.00	7.00
2500	9.00	1.00	8.80
3000	11.00	2.00	10.80
3500	13.00	2.00	12.40
4000	15.00	2.00	15.00
4500	18.00	3.00	17.20
5000	21.00	3.00	19.60
5500	24.00	3.00	22.20
6000	28.00	4.00	25.10
6500	32.00	4.00	28.50
7000	36.00	5.00	33.00
7500	1000.00	0.0	0.0
8000	1000.00	0.0	0.0
8500	1000.00	0.0	0.0
9000	1000.00	0.0	0.0
9500	1000.00	0.0	0.0
10000	1000.00	0.0	0.0
10500	1000.00	0.0	0.0
11000	1000.00	0.0	0.0

NOTE: A PER EQUAL TO 1000. INDICATES THE RANGE IS NOT ACHIEVABLE WITH THIS CHARGE

RANGE	PER	PER	TOF
500	5.00	0.0	1.40
1000	5.00	1.00	2.90
1500	6.00	1.00	4.50
2000	7.00	1.00	6.10
2500	8.00	1.00	7.80
3000	9.00	2.00	9.50
3500	10.00	2.00	11.30
4000	11.00	2.00	13.10
4500	12.00	3.00	15.00
5000	13.00	3.00	17.00
5500	15.00	3.00	19.00
6000	17.00	4.00	21.20
6500	19.00	4.00	23.50
7000	21.00	4.00	26.00
7500	23.00	5.00	28.70
8000	26.00	5.00	31.80
8500	29.00	6.00	35.50
9000	31.00	7.00	41.40
9500	1000.00	0.0	0.0
10000	1000.00	0.0	0.0
10500	1000.00	0.0	0.0
11000	1000.00	0.0	0.0

NOTE: A PER EQUAL TO 1000. INDICATES THE RANGE IS NOT ACHIEVABLE WITH THIS CHARGE

RANGE	PER	PER	TOF
500	9.00	0.00	1.10
1000	8.00	1.00	2.30
1500	8.00	1.00	3.60
2000	8.00	1.00	4.90
2500	8.00	1.00	6.40
3000	8.00	2.00	8.00
3500	10.00	2.00	9.60
4000	11.00	3.00	11.20
4500	11.00	3.00	12.90
5000	11.00	3.00	14.70
5500	12.00	3.00	16.50
6000	13.00	4.00	18.40
6500	13.00	4.00	20.40
7000	14.00	4.00	22.40
7500	14.00	5.00	24.50
8000	15.00	5.00	26.70
8500	15.00	5.00	29.10
9000	17.00	6.00	31.70
9500	18.00	6.00	34.50
10000	19.00	7.00	37.70
10500	20.00	7.00	41.60
11000	21.00	9.00	46.40

NOTE: A PER EQUAL TO 100% INDICATES THE RANGE IS NOT ACHIEVABLE WITH THIS CHARGE

PROBABILITY OF BECOMING A CASUALTY

MISS DISTANCE

2.	.0085397
4.	.0041676
6.	.0069249
8.	.0168737
10.	.0641010
12.	.0487165
14.	.0309510
16.	.0105566
18.	.0052946
20.	.0039531
22.	.0028245
24.	.0101134
26.	.0810311
28.	.7507934
30.	.7196193
32.	.6877249
34.	.5532247
36.	.4262711
38.	.5898335
40.	.5571352
42.	.4006252
44.	.2681707
46.	.1667294
48.	.0463479
50.	.0517514
52.	.0254377
54.	.0119932
56.	.0051718
58.	.0020735
60.	.0007727
62.	.0002677
64.	.0000862
66.	.0000258
68.	.0000072
70.	.0000012
72.	.0000004
74.	.0000001
76.	.0000000
78.	.0000000
80.	.0000000
82.	.0000000
84.	.0000000
86.	.0000000
88.	.0000000
90.	.0000000
92.	.0000000
94.	.0000000
96.	.0000000
98.	.0000000
100.	.0000000

NOTE: VALUES ARE BASED ON LETHALITY PARAMETER OF 52.300

PART II
 INITIAL UNIT DISPOSITIONS
 SECTION I
 MANEUVER ELEMENTS
 BRIGADE

UNIT BOUNDARIES	
LEFT	RIGHT
0.0 EAST	11408.438 NORTH
OBJECTIVE DATA	
DESCRIPTION	EAST
OBJECTIVE CENTER	5834.29
LENGTH OF MAJOR AXIS	2483.14 METERS
LENGTH OF MINOR AXIS	1282.64 METERS
FIREPLANNING CENTER	
EAST	NORTH
5906.219	0.0

UNIT BOUNDARIES

LEFT	RIGHT
0.0 EAST	6043.207 NORTH

OBJECTIVE DATA

DESCRIPTION	EAST	NORTH
OBJECTIVE CENTER	3292.92	9891.28
LENGTH OF MAJOR AXIS	1025.90 METERS	
LENGTH OF MINOR AXIS	707.08 METERS	

FIREPLANNING CENTER

EAST	NORTH
3021.604	0.0

UNIT BOUNDARIES

LEFT	RIGHT
6043.207 EAST	11904.418 NORTH

OBJECTIVE DATA

DESCRIPTION	EAST	NORTH
OBJECTIVE CENTER	8931.44	10259.00
LENGTH OF MAJOR AXIS	1037.20 METERS	
LENGTH OF MINOR AXIS	344.31 METERS	

FIREPLANNING CENTER

EAST	NORTH
2925.820	0.0

UNIT BOUNDARIES

LEFT	RIGHT
0.0 EAST	2004.865 NORTH

OBJECTIVE DATA

DESCRIPTION	EAST	NORTH
OBJECTIVE CENTER	1455.02	6210.36
LENGTH OF MAJOR AXIS	545.40 METERS	
LENGTH OF MINOR AXIS	241.06 METERS	

FIREPLANNING CENTER

EAST	NORTH
1452.432	0.0

UNIT BOUNDARIES

LEFT

2904.265 EAST

RIGHT

6043.207 NORTH

OBJECTIVE DATA

DESCRIPTION

OBJECTIVE CENTER

LENGTH OF MAJOR AXIS

LENGTH OF MINOR AXIS

EAST

4697.77

364.20 METERS

243.93 METERS

NORTH

6115.25

FIREPLANNING CENTER

EAST

4674.035

NORTH

0.0

UNIT BOUNDARIES

LEFT	RIGHT
6043.207 EAST	9008.813 NORTH

OBJECTIVE DATA

DESCRIPTION	EAST	NORTH
OBJECTIVE CENTER	7641.54	5490.23
LENGTH OF MAJOR AXIS	528.61 METERS	
LENGTH OF MINOR AXIS	291.91 METERS	

FIREPLANNING CENTER

EAST	NORTH
7526.008	0.0

UNIT BOUNDARIES

LEFT	RIGHT
9009.913 EAST	11808.438 NORTH

OBJECTIVE DATA

DESCRIPTION	EAST	NORTH
OBJECTIVE CENTER	10279.54	6096.07
LENGTH OF MAJOR AXIS	544.65 METERS	
LENGTH OF MINOR AXIS	243.74 METERS	

FIREPLANNING CENTER

EAST	NORTH
10402.625	0.0

SECTION II
ARTILLERY

BATTERY 1

ACTUAL BATTERY CENTER	3065.65	EAST	-892.71	NORTH
ASSIGNED BATTERY CENTER	3021.60	EAST	-972.51	NORTH
POSITION ERROR	-44.05	EAST	70.19	NORTH
AZIMUTH OF LAY	543.40	MILS		

WEAPON LOCATIONS

WEAPON	EAST	NORTH
1	3017.51	-909.51
2	3044.90	-916.57
3	3051.96	-389.14
4	3069.19	-879.01
5	3096.57	-886.07
6	3103.83	-853.83

BATTERY 2

ACTUAL BATTERY CENTER	5905.43	EAST	-1021.38	NORTH
ASSIGNED BATTERY CENTER	5904.22	EAST	-1032.93	NORTH
POSITION ERROR	98.79	EAST	-11.55	NORTH
AZIMUTH OF LAY	108.94	VLS		

WEAPON LOCATIONS		
WEAPON	EAST	NORTH
1	5754.65	-1016.77
2	5776.67	-1034.52
3	5794.42	-1012.50
4	5814.31	-1010.37
5	5836.33	-1028.12
6	5854.09	-1006.10

BATTERY 3

ACTUAL BATTERY CENTER	8937.07	EAST	-1011.99	NORTH
ASSIGNED BATTERY CENTER	8925.82	EAST	-1024.73	NORTH
POSITION ERROR	-11.25	EAST	-12.80	NORTH
APPROXIMATE DAY	6030.23	MILS		

WEAPON LOCATIONS

WEAPON	EAST	NORTH
1	8903.06	-984.75
2	8905.48	-1010.59
3	8931.31	-989.07
4	8949.08	-1006.23
5	8951.59	-1032.06
6	8997.34	-1020.54

INITIAL FIRE PLAN

LINE NUMBER	TARGET NUMBER	CRIC UNIT	TYPE TARGET	EAST	TARGET LOCATION	NORTH	UNIT SCHED	TIME SCHED
0	1.	1.	ON CALL	1700.83		6096.05	0.0	
1	2.	1.	SCHED	972.43		5107.10	1.00	9196.38
2	3.	3.	ON CALL	7533.23		6095.43	0.0	
3	4.	3.	SCHED	7325.24		6923.73	3.00	12462.73
4	5.	4.	SCHED	11437.44		6340.59	3.00	11413.07
5	6.	4.	PRER	10355.20		227.92	1.00	-180.00
6	8.	5.	SCHED	3718.41		9647.39	1.00	17437.29
7	9.	6.	ON CALL	11614.23		9929.79	0.0	
8	10.	6.	SCHED	8647.01		9948.55	3.00	17925.39

EVENT VECTOR LISTING

-240.000	1.000	6.000	6.000	0.0	10355.199	227.920	4.000	1.000	0.0
0.0	0.0	0.0	0.0	0.0	1.000	1.000	0.0	0.0	0.0
2.000	10355.199	227.920	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	10355.199	227.920	0.0	0.0	1.000
-180.000	2.000	6.000	6.000	100.000	10355.199	227.920	4.000	1.000	6.000
0.0	0.0	0.0	0.0	0.0	1.000	1.000	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	10355.199	227.920	1.000	0.0	10355.199	227.920	1.000	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
-155.350	3.000	6.000	6.000	100.000	10355.199	227.920	4.000	1.000	6.000
0.0	0.0	0.0	0.0	0.0	1.000	1.000	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	23.140	11.670	4.500
0.500	10355.199	227.920	1.000	6.000	10355.199	227.920	1.000	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
0.0	14.000	7.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
400.000	7.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.000	8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
120.000	7.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
150.000	8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
180.000	7.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190.000	13.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
240.000	7.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000
2450.000	8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000

TARGET NUMBER
 LOCATION
 FC ERROR
 TARGET CATEGORY
 LATERAL LENGTH
 DEPTH
 NUMBER OF TARGET ELEMENTS
 TARGET DENSITY
 TIME GENERATED
 UNIT BEING SUPPORTED
 ADJUSTING ENGAGEMENT RANGE
 INITIAL FC VALLEYS IN ADJUSTMENT
 STRATEGY USED IN FFF
 NUMBER OF VALLEYS IN FFF
 TOTAL POUNDS FIRED ON TARGET
 NUMBER OF CASUALTIES INFLICTED
 PERCENT CASUALTIES INFLICTED
 ROUNDS/CASUALTY
 TOTAL ENGAGEMENT TIME
 KILL RATE

13.00
 3417.42
 -8.18
 2.00
 439.90
 198.61
 193.00
 0.0
 3201.50
 2.00
 2.00
 4730.83
 5.00
 1.00
 3.00
 64.00
 101.00
 0.52
 9.83
 790.07
 0.130
 2984.38 NORTH
 -12.22 NORTHING
 EAST
 EASTING
 METERS
 METERS
 METERS
 SECONDS
 CASUALTIES/SECOND

TARGET NUMBER
 LOCATION
 FC ERROR
 TARGET CATEGORY
 LATERAL LENGTH
 DEPTH
 NUMBER OF TARGET ELEMENTS
 TARGET DENSITY
 TIME GENERATED
 UNIT BEING SUPPORTED
 ADJUSTING ENGAGEMENT RANGE
 INITIAL FC VALLEYS IN ADJUSTMENT
 STRATEGY USED IN FFF
 NUMBER OF VALLEYS IN FFF
 TOTAL POUNDS FIRED ON TARGET
 NUMBER OF CASUALTIES INFLICTED
 PERCENT CASUALTIES INFLICTED
 ROUNDS/CASUALTY
 TOTAL ENGAGEMENT TIME
 KILL RATE

2.00
 7532.23
 0.0
 1.00
 262.27
 246.05
 62.00
 0.0
 10517.51
 3.00
 3.00
 7312.13
 2.00
 4.00
 3.00
 58.00
 49.00
 0.77
 1.13
 619.33
 0.000
 6095.43 NORTH
 0.0 NORTHING
 EAST
 EASTING
 METERS
 METERS
 METERS
 METERS
 SECONDS
 CASUALTIES/SECOND

TARGET NUMBER	6.00	1.00PREP
TARGET TYPE	0.0	
UNIT ORIGINATING	4.00	
TIME SCHEDULED	-180.00	
TIME FIRED	-240.00	
UNIT FIRED	1.00	
STRATEGY USED	1.00	
NUMBER OF VOLLEYS IN FFE	1.00	
TOTAL ROUNDS FIRED	6.00	
TOTAL TARGET ELEMENTS	0.0	
TOTAL CASUALTIES INFLICTED	0.0	

TARGET NUMBER	1.00	0.0 PREP
TARGET TYPE	1.00	
UNIT ORIGINATING	1.00	
TIME SCHEDULED	0.0	
TIME FIRED	7545.89	
UNIT FIRED	1.00	
STRATEGY USED	1.00	
NUMBER OF VOLLEYS IN FFE	4.00	
TOTAL ROUNDS FIRED	36.00	
TOTAL TARGET ELEMENTS	0.0	
TOTAL CASUALTIES INFLICTED	0.0	

TARGET NUMBER	5.00	0.0 PREP
TARGET TYPE	1.00	
UNIT ORIGINATING	4.00	
TIME SCHEDULED	11413.07	
TIME FIRED	11353.07	
UNIT FIRED	3.00	
STRATEGY USED	2.00	
NUMBER OF VOLLEYS IN FFE	1.00	
TOTAL ROUNDS FIRED	6.00	
TOTAL TARGET ELEMENTS	0.0	
TOTAL CASUALTIES INFLICTED	0.0	

TARGET NUMBER	4.00	0.0 PREP
TARGET TYPE	1.00	
UNIT ORIGINATING	3.00	
TIME SCHEDULED	12462.73	
TIME FIRED	12402.73	
UNIT FIRED	3.00	
STRATEGY USED	1.00	
NUMBER OF VOLLEYS IN FFE	4.00	
TOTAL ROUNDS FIRED	36.00	
TOTAL TARGET ELEMENTS	210.00	
TOTAL CASUALTIES INFLICTED	95.00	

TARGET NUMBER	34.00	SCHD	0.0	PREP	1.00	TGT OPP
TARGET TYPE	0.0					
UNIT SCHEDULED TO FIRE	100.00					
TIME SCHEDULED OR ORIGINATED	37535.07					
TIME FIRED	37607.99					
TOTAL ENGAGEMENT TIME	1199.14					

TARGET NUMBER	21.00	SCHD	0.0	PREP	0.0	TGT OPP
TARGET TYPE	1.00					
UNIT SCHEDULED TO FIRE	100.00					
TIME SCHEDULED OR ORIGINATED	0.0					
TIME FIRED	39105.32					
TOTAL ENGAGEMENT TIME	997.06					

TARGET NUMBER	44.00	SCHD	1.00	PREP	0.0	TGT OPP
TARGET TYPE	0.0					
UNIT SCHEDULED TO FIRE	100.00					
TIME SCHEDULED OR ORIGINATED	0.0					
TIME FIRED	40737.42					
TOTAL ENGAGEMENT TIME	300.00					

TARGET NUMBER	41.00	SCHD	1.00	PREP	0.0	TGT OPP
TARGET TYPE	1.00					
UNIT SCHEDULED TO FIRE	100.00					
TIME SCHEDULED OR ORIGINATED	0.0					
TIME FIRED	41007.42					
TOTAL ENGAGEMENT TIME	300.00					

TARGET NUMBER	38.00	SCHD	0.0	PREP	0.0	TGT OPP
TARGET TYPE	1.00					
UNIT SCHEDULED TO FIRE	100.00					
TIME SCHEDULED OR ORIGINATED	0.0					
TIME FIRED	49497.13					
TOTAL ENGAGEMENT TIME	900.10					

AVERAGE QUEUE LENGTH BY QUEUE

1	2	3	4
0.0007144	0.0061912	0.0	0.0

AVERAGE TIME TARGET IN QUEUE (BY QUEUE)

1	2	3	4
43.13	175.11	0.0	0.0

AVERAGE KILL RATE FOR A TARGET OF OPPORTUNITY

0.1278993 CASUALTIES/SECOND OF ENGAGEMENT TIME

AVERAGE ROUNDS / CASUALTY FOR TARGET OF OPPORTUNITY

0.498486 ROUNDS / CASUALTY

APPENDIX D

Event Vector Guide

The model event chain resides in the array EVLIST which is dimensioned 250x50. Each time a requirement for some future event is generated, an event vector is initialized. Each time the next event in time is selected from the EVLIST array, the vector is stored temporarily as the row vector CEVENT. This appendix describes the relevant storage locations for each of the type events in the model. Tabs to this appendix describe the event vector location descriptions according to the scheme below:

<u>Tab</u>	<u>Description</u>
1	Target Analysis Shooting Event Damage Assessment
2	Tactical Situation Update Current Artillery Position Evaluation Target of Opportunity Generation On-Call Target Conversion Queue Checking Event Storage Maintenance
3	Weapon Positioning Fireplanning Event Fire Allocation Reinitialize Unit Status Flags Disengage a Maneuver Element

Tab 1

APPENDIX D

Target Analysis
Shooting Event
Damage Assessment

The storage locations in the event vector are identified as follows for the above events:

<u>Storage Location</u>	<u>Description</u>
1	Time the event will take place.
2	Routine code.
3	Target number of the target in question.
4	Row in the target history array (TGT) where the target information is being stored.
5	Row in the target description array where position information on the target elements is stored.
6	Easting component of the reported target location.
7	Northing component of the reported target location.
8	Maneuver element being supported.
9	Artillery unit scheduled to fire.
10	Number of rounds that Battery 1 will fire on the next volley.
11	Number of rounds that Battery 2 will fire on the next volley.
12	Number of rounds that Battery 3 will fire on the next volley.

- 13 Number of casualties inflicted.
- 14 Time the mission was terminated.
- 15 Time for the maneuver element to become disengaged.
- 16 Adjustment completion code. This entry is 1 if no adjustment is taking place or if the adjustment is completed. If these are not the case, the value is 0.
- 17 Initial fire request code. If the request is an initial request, this entry is 1. If not, the entry is 0.
- 18 Number of target elements in the target complex.
- 19 The time the engagement was initiated.
- 20 Open Storage.
- 21 Priority of the target.
- 22 Number of volleys remaining for Battery 1 to fire.
- 23 Number of volleys remaining for Battery 2 to fire.
- 24 Number of volleys remaining for Battery 3 to fire.
- 25 Strategy identifier for the strategy to be used in fire for effect phase.
- 26 Variance of the distribution of range error for Battery 1.
- 27 Variance of the distribution of range error for Battery 2.
- 28 Variance of the distribution of range error for Battery 3.
- 29 Variance of the distribution of deflection error for Battery 1

- 30 Variance of the distribution of deflection error for Battery 2.
- 31 Variance of the distribution of deflection error for Battery 3.
- 32 Easting coordinate of the initial fire for effect aimpoint.
- 33 Northing coordinate of the initial fire for effect aimpoint.
- 34 Principal artillery unit involved in the mission.
- 35 Cumulative rounds fired on the target.
- 36 Easting coordinate of the actual target location.
- 37 Northing coordinate of the actual target location.
- 38 If Battery 1 is committed to the mission, this entry is 1. Otherwise, the entry is 0.
- 39 If Battery 2 is committed to the mission, this entry is 1. Otherwise, the entry is 0.
- 40 If Battery 3 is committed to the mission, this entry is 1. Otherwise, the entry is 0.

Tab 2

APPENDIX D

Tactical Situation Update
Current Artillery Position Evaluation
Target of Opportunity Generation
On-Call Target Conversion
Queue Checking Event
Storage Maintenance

For the above events, the storage locations in the CEVENT vector have the following significance:

<u>Storage Location</u>	<u>Description</u>
1	Time the event will take place.
2	Routing code appropriate to the particular event. The routing code corresponds to the IKEY variable in the main program.

Tab 3

APPENDIX D

Weapon Positioning
Fireplanning Event
Fire Allocation
Reinitialize Unit Status Flag
Disengage a Maneuver Element

The storage locations in the CEVENT vector have the following descriptions for the above events:

<u>Storage Location</u>	<u>Description</u>
1	Time the event will take place.
2	Routing code.
3	Specific unit involved.
4	Has significance only for the fire allocation event and specifies the time for reinitialization of the attack.

APPENDIX E

Computer Program

This appendix contains the complete program to include the necessary job control cards for the IBM 360 computer. The programming language used is FORTRAN IV.

The program contains all the subroutines necessary for random number generation. The pseudorandom numbers used in the program are generated using a congruential method. The routine which generates the random numbers is the UGEN routine. Normal variates are generated by the NGEN routine and the truncated normal variates are generated by the TNGEN routine. The exponential variates are generated by the EXPON routine. The methods used to generate the standard normal, exponential, and uniform variates are as described by Naylor (1). Truncated normal variates are generated using a rejection technique. Under this method, variates are generated until one falls within the limits defined for the variable. All numbers generated prior to the selected number are discarded.

The random number generator, UGEN, is initialized by specifying a seed, NU, which is an input parameter to the program. Any positive number can be selected for NU. The characteristics of mixed congruential generators are such that only through empirical testing can one have confidence in the statistical properties of sequences generated by this method.

JOB CONTROL SECTION

```

// EXEC      FORTCLG,TIME,FORT=2,TIME.LINK=2,REGION.GO=370K,TIME.GO=10
// FORT.SYSRINT DD SPACE=(CYL,(9,1))
// FORT.SYSIN DD *
/

```

ARTILLERY FIRE SUPPORT SIMULATION MODEL

MAIN PROGRAM

```

COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

```

READ IN THE MODEL PARAMETERS

CALL RDPAR

GENERATE THE INITIAL TACTICAL SITUATION

```

CALL SETUP
DO 999 I=1,50
CEVENT(I)=0.0

```

LOCATE THE CURRENT EVENT AND RECORD THE EVENT IN OFFLINE STORAGE

```

CALL TNE
IF(CEVENT(2) .EQ. 6) GO TO 1500
CALL WEVENT
CONTINUE
CTIME=CEVENT(1)
IKEY= CEVENT(2)
GO TO (1,2,3,4,5,6,7,8,9,10,11,12,13,14,15),IKEY

```

CONDUCT ANALYSIS OF TARGET

```

CALL TOANAL
GO TO 1000

```

DETERMINE THE FIRING PARAMETERS

```

CALL SHOOT
GO TO 1000

```

ASSESS DAMAGE TO THE TARGET

```

MA 00010
MA 00020
MA 00030
MA 00040
MA 00050
MA 00060
MA 00070
MA 00080
MA 00090
MA 00100
MA 00110
MA 00120
MA 00130
MA 00140
MA 00150
MA 00160
MA 00170
MA 00180
MA 00190
MA 00200
MA 00210
MA 00220
MA 00230
MA 00240
MA 00250
MA 00260
MA 00270
MA 00280
MA 00290
MA 00300
MA 00310
MA 00320
MA 00330
MA 00340
MA 00350
MA 00360
MA 00370
MA 00380
MA 00390
MA 00400
MA 00410
MA 00420

```


C 3	CALL DAMAGE	MA 00430
	GO TO 1000	MA 00440
C C C C 4	CHECK THE QUEUES FOR TARGETS ON HOLD STATUS	MA 00450
		MA 00460
		MA 00470
		MA 00480
		MA 00490
		MA 00500
		MA 00510
		MA 00520
C C C 5	INTERJECT AN ON CALL TARGET	MA 00530
		MA 00540
		MA 00550
		MA 00560
		MA 00570
		MA 00580
C C C C 6	GATHER THE QUEUE STATISTICS	MA 00590
		MA 00600
		MA 00610
		MA 00620
C C C 7	UPDATE THE TACTICAL SITUATION	MA 00630
		MA 00640
		MA 00650
		MA 00660
		MA 00670
		MA 00680
C C C C 8	DETERMINE IF ANY ARTILLERY UNITS SHOULD MOVE	MA 00690
		MA 00700
		MA 00710
		MA 00720
C C C C 9	MOVE SPECIFIED ARTILLERY UNIT	MA 00730
		MA 00740
		MA 00750
		MA 00760
		MA 00770
		MA 00780
		MA 00790
C C	SPECIFIED UNIT CONDUCTS FIRE PLANNING	MA 00800
C C 10		MA 00810
		MA 00820
		MA 00830
		MA 00840
		MA 00850
C C	ALLOCATE TARGETS TO FIRE UNITS	MA 00860
C 11		MA 00870
		MA 00880
		MA 00890
C		MA 00900

C	GENERATE A TARGET OF OPPORTUNITY	MA 00910
C	CALL TOGEN	MA 00920
12	GO TO 1000	MA 00930
C		MA 00940
C	CLEAR STORAGE ARRAYS OF UNNECESSARY INFORMATION	MA 00950
C		MA 00960
13	CALL EXTGT	MA 00970
C	GO TO 1000	MA 00980
C		MA 00990
C	REINITIALIZE SPECIFIED UNIT STATUS FLAGS	MA 01000
C		MA 01010
14	NUNIT= CEVENT(3)	MA 01020
C	CALL RESET(NUNIT)	MA 01030
C	GO TO 1000	MA 01040
C		MA 01050
C	DISENGAGE A MANEUVER ELEMENT	MA 01060
C		MA 01070
C		MA 01080
15	CALL DISGE	MA 01090
C	GO TO 1000	MA 01100
C		MA 01110
C	PRINT OUT FINAL REPORT	MA 01120
C		MA 01130
2000	CALL SUMRY	MA 01140
C	STOP	MA 01150
C	END	MA 01160

C	SUBROUTINE DECIS (RMODE)	MA 01170
C	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),IIGT,	MA 01180
C	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),	MA 01190
C	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MA 01200
C	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MA 01210
C	2XTLETH,STAT(20,4)	MA 01220
C	UPDATE LOCATIONS OF UNIT FPC'S	MA 01230
C	CALL MUNIT	MA 01240
C	VERIFY STATUS OF EACH UNIT	MA 01250
C		MA 01260
C		MA 01270
C		MA 01280
C		MA 01290
C		MA 01300
302	DO 1000 I=1,7	MA 01310
7000	I=STAT= GDATA(I,2)	MA 01320
C	GO TO (100,200,300,400,500,600,1000,1000), I=STAT	MA 01330
C	VERIFY STATE I	MA 01340
C		MA 01350
C		MA 01360

100	CONTINUE	MA 01370
	IF(I.NE. 7) GO TO 1000	MA 01380
	RMODE=1.0	MA 01390
	GO TO 7500	MA 01400
C		MA 01410
C		MA 01420
C	CURRENT UNIT STATE IS 2, SEE IF SHOULD GO TO STATE 3	MA 01430
200	IF((GDATA(I,8)-GDATA(I,13)).LE. 1/3.*GDATA(I,19)) GDATA(I,2)=3.0	MA 01440
	IF(GDATA(I,2).EQ. 3.0) GO TO 302	MA 01450
	GO TO (201,202,203,204,205,206,1000),I	MA 01460
201	IS=2	MA 01470
	GO TO 220	MA 01480
202	IS=1	MA 01490
	GO TO 220	MA 01500
203	IS=4	MA 01510
	GO TO 220	MA 01520
204	IS=3	MA 01530
	GO TO 220	MA 01540
205	IS=6	MA 01550
	GO TO 220	MA 01560
206	IS=5	MA 01570
C		MA 01580
C	CHECK TO SEE IF UNIT SHOULD GO TO ADMIN MOLD	MA 01590
C		MA 01600
220	IF((GDATA(I,13)-GDATA(IS,13)).GE. 1/5.*GDATA(I,19) .AND. GDATA(MA 01610
	2IS,2).NE. 8) GDATA(I,2)= 6.0	MA 01620
	GO TO 1000	MA 01630
C		MA 01640
C	CURRENT UNIT STATE IS 3, SEE IF SHOULD GO TO STATE 4	MA 01650
C		MA 01660
300	CALL FIX(I,IRES1)	MA 01670
	IF(IRES1.EQ. 0) GO TO 1000	MA 01680
	GDATA(I,2)= 4.0	MA 01690
	GO TO 302	MA 01700
C		MA 01710
C	CURRENT UNIT STATE IS 4, SEE IF SHOULD BE 5	MA 01720
C		MA 01730
400	CALL OBJSEC(I,JRES1)	MA 01740
	IF(JRES1.EQ. 1 .AND. I.EQ. 7) GO TO 100	MA 01750
	IF(JRES1.EQ. 0) GO TO 1000	MA 01760
	CALL FIOBJ(I,KRES)	MA 01770
	IF (KRES.EQ. 0) GO TO 402	MA 01780
	IF (KRES.EQ. 1) GO TO 403	MA 01790
402	GDATA(I,2)= 5.0	MA 01800
	GO TO 302	MA 01810
403	GDATA(I,2)= 9.0	MA 01820
	GO TO 302	MA 01830
500	GO TO 1000	MA 01840

C		UNIT IS UNDER ADMIN HOLD, SEE IF SHOULD BE LIFTED	MA	01850
C			MA	01860
C			MA	01870
600			MA	01880
601		GO TO (601,602,603,604,605,606,1000),I	MA	01890
		IS=2	MA	01900
602		GO TO 650	MA	01910
		IS=1	MA	01920
603		GO TO 650	MA	01930
		IS=4	MA	01940
604		GO TO 650	MA	01950
		IS=3	MA	01960
605		GO TO 650	MA	01970
		IS=6	MA	01980
		GO TO 650	MA	01990
606		IS=5	MA	02000
650		IF((GDATA(I,13)-GDATA(IS,13)) .GE. 1/5.*GDATA(I,19) .AND. GDATA(MA	02010
		2IS,2) .NE. 8) GO TO 1000	MA	02020
		GDATA(I,2)= 2.0	MA	02030
		GO TO 302	MA	02040
		C CONTINUE	MA	02050
1000			MA	02060
C		ASSIGN NEW BATTALION OBJECTIVES IF NECESSARY	MA	02070
C			MA	02080
		I1=5	MA	02090
		I2=6	MA	02100
		IU=7	MA	02110
1005		DO 1100 I=1,I2	MA	02120
		IF(GDATA(I,2) .NE. 5) GO TO 1100	MA	02130
		CALL OBJ(I,GDATA(I,2))	MA	02140
		C CONTINUE	MA	02150
1100			MA	02160
C		ASSIGN NEW COMPANY OBJECTIVES IF NECESSARY	MA	02170
C			MA	02180
		DO 1200 I=1,4	MA	02190
		IF(GDATA(I,2) .NE. 5) GO TO 1200	MA	02200
		IF(I .GT. 2) IU=6	MA	02210
		IF(I .LE. 2) IU=5	MA	02220
		IF(GDATA(IU,2) .EQ. 4) GO TO 1200	MA	02230
		CALL OBJ(I, GDATA(I,2))	MA	02240
		C CONTINUE	MA	02250
1200			MA	02260
C		DO FIREPLANNING AND ASSIGN NEW KICKOFF TIMES IF NECESSARY	MA	02270
C			MA	02280
1300		IF(GDATA(5,2) .EQ. 8 .AND. GDATA(6,2) .EQ. 8) GO TO 4000	MA	02290
		DO 4010 I=5,6	MA	02300
		IF(GDATA(I,2) .NE. 7) GO TO 4010	MA	02310
		IF(I .EQ. 5) R1=8.	MA	02320
		IF(I .EQ. 6) R1=9.	MA	

4005	R2= I UGEN((CTIME+1800),(CTIME+3600),QHOUR)	MA 02330
	CALL SET(QHOUR,R1,R2)	MA 02340
	GDATA(I,2)= 1.0	MA 02350
	IF(I .EQ. 5) GO TO 4005	MA 02360
	IN1=3	MA 02370
	IN2=4	MA 02380
	GO TO 4006	MA 02390
4006	IN1=1	MA 02400
4007	IN2=2	MA 02410
4010	DO 4007 IV= IN1,IN2	MA 02420
	GDATA(IV,2)= 1.0	MA 02430
	CONTINUE	MA 02440
	DO 4100 I=1,4	MA 02450
	IF(I .EQ. 1) ISIS=2	MA 02460
	IF(I .EQ. 2) ISIS=1	MA 02470
	IF(I .EQ. 3) ISIS=4	MA 02480
	IF(I .EQ. 4) ISIS=3	MA 02490
	IF(I .LE. 2) J=5	MA 02500
	IF(I .GT. 2) J=6	MA 02510
	IF(GDATA(J,2) .EQ. 8) GO TO 4100	MA 02520
	IF(GDATA(I,2) .EQ. 8) AND GDATA(ISIS,2) .EQ. 8) GO TO 4300	MA 02530
	IF(GDATA(I,2) .NE. 7) GO TO 4100	MA 02540
	CALL UGEN((CTIME+900),(CTIME+1800),QHOUR)	MA 02550
	R2=I	MA 02560
4013	R1=I SET(QHOUR,R1,R2)	MA 02570
	GDATA(I,2)= 1.0	MA 02580
4300	GO TO 4100	MA 02590
	CALL UGEN((CTIME+1800),(CTIME+2400),QHOUR)	MA 02600
	IF(I .EQ. 1) OR I .EQ. 2) R1=8.	MA 02610
	IF(I .EQ. 3) OR I .EQ. 4) R1=9.	MA 02620
	IF(I .EQ. 3) OR I .EQ. 4) R2=6.	MA 02630
	IF(I .EQ. 1) OR I .EQ. 2) R2=5.	MA 02640
	GDATA(ISIS,2)= 1.0	MA 02650
4100	GO TO 4013	MA 02660
	CONTINUE	MA 02670
4000	GO TO 6000	MA 02680
	CALL UGEN((CTIME+2400),(CTIME+4200),QHOUR)	MA 02690
	R1= 10.	MA 02700
	R2=7.	MA 02710
	CALL SET(QHOUR,R1,R2)	MA 02720
4700	DO 4700 I=1,6	MA 02730
6000	GDATA(I,2)= 1.0	MA 02740
	RMODE=0.0	MA 02750
	IF(IRST(IROW,1) .EQ. 4) GO TO 7600	MA 02760
	EVL IST(IROW,1)= CTIME+600	MA 02770
	GO TO 7500	MA 02780
		MA 02790
		MA 02800

7600
7500

EVLIST(IROW,1)= 1000000.
RETURN
END

MA 02810
MA 02820
MA 02830

C

SUBROUTINE MUNIT

MA 02840
MA 02850
MA 02860

COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

C

CHECK TO SEE IF THE BATTALION IS UNDER A HOLD

MA 02910
MA 02920

C

DO 100 I=5,6

IF (GDATA(I,2) .EQ.6) GO TO 200

C

BATTALION IS FREE

MA 02930
MA 02940
MA 02950

C

GO TO 105
CONTINUE

MA 02960
MA 02970
MA 02980

100

GO TO 300

105

IF (I.EQ.5) J=1

IF (I.EQ.6) J=3

K=J+1

DO 251 IJ=J,K

ISTAT=GDATA(IJ,2)

IF (GDATA(IJ,16) .EQ. 1) GO TO 250

MA 03000
MA 03010

GO TO (250,240,241,250,250,250,250,250),ISTAT
IF (GDATA(IJ,12).GT.GDATA(IJ,17)) GO TO 270

MA 03020
MA 03030
MA 03040

CALL UGEN (0.0,1.0472,ANGLE)

GO TO 261

CALL UGEN (0.0,-1.0472,ANGLE)

CALL NLOC2(IJ,ANGLE)

GDATA(IJ,14)= CTIME

CONTINUE

GO TO 100

CALL NLOC3(IJ)

GO TO 250

BATTALION IS UNDER A HOLD

MA 03050
MA 03060
MA 03070

MA 03080
MA 03090
MA 03100

MA 03110
MA 03120
MA 03130

MA 03140
MA 03150
MA 03160

MA 03170
MA 03180
MA 03190

MA 03200
MA 03210
MA 03220

MA 03230
MA 03240
MA 03250

MA 03260

200

CONTINUE

IF (I.EQ. 5) J=1

IF (I.EQ.6) J=3

K=J+1

DO 600 IJ=J,K

500	IF (GDATA(IJ,16) .EQ. 1) GO TO 599	MA 03270
	ISTAT= GDATA(IJ,2)	MA 03280
	GO TO (599,500,501,599,599,599,599),ISTAT	MA 03290
	SDIS= GDATA(I,13)-GDATA(IJ,13)	MA 03300
	IF (SDIS .GE. 0) GO TO 599	MA 03310
	IF (SDIS .GE. -500) GO TO 599	MA 03320
	IF (GDATA(IJ,12) .GT. GDATA(IJ,17)) GO TO 620	MA 03330
	CALL UGEN (0.0,1.0472,ANGLE)	MA 03340
	GO TO 621	MA 03350
620	CALL UGEN(0.0,-1.0472,ANGLE)	MA 03360
621	CALL NLOC2(IJ,ANGLE)	MA 03370
599	GDATA(IJ,14)= CTIME	MA 03380
600	CONTINUE	MA 03390
	GO TO 100	MA 03400
501	CALL NLOC3(IJ)	MA 03410
	GO TO 599	MA 03420
C		MA 03430
C	COMPUTE NEW FIREPLANNING CENTERS	MA 03440
300	DO 1200 I=5,6	MA 03450
	IF (I.EQ.5) J=1	MA 03460
	IF (I.EQ.6) J=3	MA 03470
	SUME=0.0	MA 03480
	SUMN=0.0	MA 03490
	K=J+1	MA 03500
	DO 1201 IJ=J,K	MA 03510
	SUME= SUME+GDATA(IJ,12)	MA 03520
1201	SUMN= SUMN+ GDATA(IJ,13)	MA 03530
	CONTINUE	MA 03540
	GDATA(I,12)= SUME/2	MA 03550
	GDATA(I,13)= SUMN/2	MA 03560
1200	CONTINUE	MA 03570
C		MA 03580
C	DO THE BRIGADE NOW	MA 03590
C		MA 03600
	GDATA(7,12)=(GDATA(5,12)+GDATA(6,12))/2.	MA 03610
	GDATA(7,13)= (GDATA(5,13)+ GDATA(6,13))/2.	MA 03620
	RETURN	MA 03630
	END	MA 03640
		MA 03650
C	SUBROUTINE NLOC2(NUNIT,ANGLE)	MA 03660
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MA 03670
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MA 03680
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MA 03690
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MA 03700
	2XTLETH ,STAT(20,4)	MA 03710
		MA 03720

C	DETERMINE THE RANDOM RATE OF ADVANCE	MA 03730
C		MA 03740
C		MA 03750
	CALL UGEN(PRDATA(1,NUNIT,16,1),PRDATA(1,NUNIT,16,2),RATE)	MA 03760
	SRATE= 1000.*RATE/3600	MA 03770
C		MA 03780
C	COMPUTE DISTANCE MOVED	MA 03790
C		MA 03800
	DIS= SRATE*(CTIME-GDATA(NUNIT,14))	MA 03810
C		MA 03820
C	DETERMINE NEW FIRE PLANNING CENTER	MA 03830
C		MA 03840
200	GDATA(NUNIT,12)= GDATA(NUNIT,12)+ DIS*SIN(ANGLE)	MA 03850
	GDATA(NUNIT,13)= GDATA(NUNIT,13)+ DIS*COS(ANGLE)	MA 03860
6000	RETURN	MA 03870
	END	MA 03880
C	SUBROUTINE NLOC3(NUNIT)	MA 03890
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MA 03900
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MA 03910
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MA 03920
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MA 03930
	2XTLETH ,STAT(20,4)	MA 03940
		MA 03950
C	COMPUTE X AND Y COMPONENTS OF DISTANCE FROM FPC TO UNIT OBJECTIVE	MA 03960
C	AND CURRENT DIRECTION TO OBJECTIVE.	MA 03970
C		MA 03980
C		MA 03990
100	DISN= GDATA(NUNIT,8)-GDATA(NUNIT,13)	MA 04000
	DISE= GDATA(NUNIT,7)-GDATA(NUNIT,12)	MA 04010
	ARG=DISE/DISN	MA 04020
	ANGLE= ATAN(ARG)	MA 04030
C		MA 04040
C	DETERMINE RATE OF MOVEMENT AND COMPUTE DISTANCE MOVED	MA 04050
C		MA 04060
200	CALL UGEN(PRDATA(1,NUNIT,16,1),PRDATA(1,NUNIT,16,2),RATE)	MA 04070
	SRATE= 1000.*RATE/3600	MA 04080
	DIS= SRATE*(CTIME-GDATA(NUNIT,14))	MA 04090
C		MA 04100
C	DETERMINE NEW FIRE PLANNING CENTER	MA 04110
C		MA 04120
	GDATA(NUNIT,12)= GDATA(NUNIT,12)+ DIS*SIN(ANGLE)	MA 04130
	GDATA(NUNIT,13)= GDATA(NUNIT,13)+DIS*COS(ANGLE)	MA 04140
6000	RETURN	MA 04150
	END	MA 04160


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C
SUBROUTINE FIX(NUNIT, IRES)
COMMON NU, PRDATA(3, 7, 20, 10), GDATA(7, 20), TGT(250, 40), ITGT,
2EVLIST(250, 50), ARDATA(4, 7, 16), IROW, IDES(10, 300, 4), FD105(4, 50, 3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4, 20, 50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20, 4)

C
IRES=0
GO TO (400, 400, 400, 400, 500, 500, 700), NUNIT
IF (GDATA(NUNIT, 2) .EQ. 4) GO TO 6000
IF (ABS(GDATA(NUNIT, 7))-GDATA(NUNIT, 12))
DISN= GDATA(NUNIT, 8)-GDATA(NUNIT, 13)
DISOBJ= SQRT(DISE**2+DISN**2)
IF (DISOBJ .LT. 200 .OR. GDATA(NUNIT, 13) .GT. GDATA(NUNIT, 8))
2IRES=1
IF (IRES .NE. 1) GO TO 7000
GDATA(NUNIT, 15)= CTIME
GDATA(NUNIT, 2)= 4.0
GO TO 7000

500
IF (NUNIT .EQ. 5) J=1
IF (NUNIT .EQ. 6) J=3
K=J+1
DO 1100 IJ=J, K
IF (GDATA(IJ, 20) .NE. 1 .OR. GDATA(IJ, 2) .NE. 4) GO TO 7000
CONTINUE
IRES=1
GO TO 7000

700
DO 1200 I= 1, 4
IF (I .LE. 2) J=5
IF (I .GT. 2) J=6
IF (GDATA(I, 20) .NE. 1 .OR. GDATA(J, 20) .NE. 1) GO TO 7000
IF (GDATA(I, 2) .LT. 4) GO TO 7000
CONTINUE
IRES=1
GO TO 7000

6000
IRES=1
GO TO 7000

5900
IRES=0
GO TO 7000

7000
RETURN
END

```

MB 00010
 MB 00020
 MB 00030
 MB 00040
 MB 00050
 MB 00060
 MB 00070
 MB 00080
 MB 00090
 MB 00100
 MB 00110
 MB 00120
 MB 00130
 MB 00140
 MB 00150
 MB 00160
 MB 00170
 MB 00180
 MB 00190
 MB 00200
 MB 00210
 MB 00220
 MB 00230
 MB 00240
 MB 00250
 MB 00260
 MB 00270
 MB 00280
 MB 00290
 MB 00300
 MB 00310
 MB 00320
 MB 00330
 MB 00340
 MB 00350
 MB 00360
 MB 00370
 MB 00380
 MB 00390
 MB 00400

```

C
SUBROUTINE OBJSEC(NUNIT, IRES)
COMMON NU, PRDATA(3, 7, 20, 10), GDATA(7, 20), TGT(250, 40), ITGT,
2EVLIST(250, 50), ARDATA(4, 7, 16), IROW, IDES(10, 300, 4), FD105(4, 50, 3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4, 20, 50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20, 4)

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MB 00410
 MB 00420
 MB 00430
 MB 00440
 MB 00450
 MB 00460


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C          2XTLETH ,STAT(20,4)
          IRES=0
          GO TO (100,100,100,100,500,600),NUNIT
          IF (GDATA(NUNIT,16) .EQ. 0.0 .AND. (CTIME--GDATA(NUNIT,15))
2.GT. 2700) GO TO 101
          IRES=0
          GO TO 6000
          IRES=1
          GO TO 6000
          IF (NUNIT .EQ. 5) J=1
          IF (NUNIT .EQ. 6) J=3
          K=J+1
          DO 1100 I=J,K
          IF(GDATA(IJ,16) .NE. 0.0 .OR. (CTIME--GDATA(IJ,15)) .LT.
2 2700) GO TO 501
          CONTINUE
          IRES=1
          GO TO 6000
          IRES=0
          GO TO 6000
          DO 602 I=1,4
          IF (GDATA(I,16) .NE. 0.0 .OR. (CTIME--GDATA(I,15)) .LT.
2 2700) GO TO 605
          CONTINUE
          IRES=1
          GO TO 6000
          IRES=0
          RETURN
          END
605
6000

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```

MB 00470
MB 00480
MB 00490
MB 00500
MB 00510
MB 00520
MB 00530
MB 00540
MB 00550
MB 00560
MB 00570
MB 00580
MB 00590
MB 00600
MB 00610
MB 00620
MB 00630
MB 00640
MB 00650
MB 00660
MB 00670
MB 00680
MB 00690
MB 00700
MB 00710
MB 00720
MB 00730
MB 00740
MB 00750
MB 00760

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SUBROUTINE OBJ(NUNIT,SRES)
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH ,STAT(20,4)
C          GO TO (100,100,100,100,200,200),NUNIT
          IF (NUNIT .EQ. 1. OR. NUNIT.EQ.2) J=5
          IF (NUNIT.EQ.3. OR. NUNIT.EQ.4) J=6
          IF (ABS(GDATA(J,8)--GDATA(NUNIT,8)) .LT. PRDATA(1,NUNIT,3,1)/3.
2) GO TO 140
          SRES=7.
          GDATA(NUNIT,20)= 0.0
          OLDDIS= GDATA(NUNIT,8)

```

```

MB 00770
MB 00780
MB 00790
MB 00800
MB 00810
MB 00820
MB 00830
MB 00840
MB 00850
MB 00860
MB 00870
MB 00880
MB 00890
MB 00900
MB 00910
MB 00920

```


CALL TNGEN((GDATA(NUNIT,8)+PRDATA(1,NUNIT,3,1)),PRDATA(1,NUNIT,3,MB	00930
22),GDATA(NUNIT,13),(GDATA(NUNIT,13)+PRDATA(1,NUNIT,3,4)),	00940
3GDATA(NUNIT,8))	MB
GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS	MB
IF(GDATA(NUNIT,8) .GE. (GDATA(J,8)-GDATA(J,10))) GO TO 1627	MB
CALL TNGEN(GDATA(NUNIT,17),PRDATA(1,NUNIT,17,2),GDATA(NUNIT,3),	00960
2GDATA(NUNIT,5),GDATA(NUNIT,7))	MB
CALL TNGEN(PRDATA(1,NUNIT,4,1),PRDATA(1,NUNIT,4,2),PRDATA(1,NUNIT	00970
2,4,3),PRDATA(1,NUNIT,4,4),GDATA(NUNIT,9))	MB
CALL TNGEN(PRDATA(1,NUNIT,5,1),PRDATA(1,NUNIT,5,2),PRDATA(1,NUNIT	00980
2,5,3),PRDATA(1,NUNIT,5,4),GDATA(NUNIT,10))	MB
GO TO 6000	01000
GDATA(NUNIT,8)= OLDDIS	01010
SRES=8.	01020
GDATA(NUNIT,20)= 1.0	01030
OLDDIS= GDATA(NUNIT,8)	01040
IF(NUNIT .EQ. 1 .OR. NUNIT .EQ. 3) GO TO 141	01050
ISIDE= 2	01060
GO TO 143	01070
ISIDE= 1	01080
LEFT MOST COMPANY	01090
DE=GDATA(J,9)/2*CQS(ABS(GDATA(J,11)))	01100
DN= GDATA(J,9)/2*SIN(ABS(GDATA(J,11)))	01110
GO TO (144,145),ISIDE	01120
IF (GDATA(J,11)) 150,150,151	01130
GDATA(NUNIT,7)= GDATA(J,7)-DE/2	01140
GDATA(NUNIT,8)= GDATA(J,8)+DN/2	01150
GDATA(NUNIT,11)= GDATA(J,11)	01160
GDATA(NUNIT,9)= GDATA(J,9)/2	01170
GDATA(NUNIT,10)= GDATA(J,10)	01180
GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS	01190
GO TO 6000	01200
GDATA(NUNIT,7)= GDATA(J,7)-DE/2	01210
GDATA(NUNIT,8)= GDATA(J,8)-DN/2	01220
GDATA(NUNIT,11)= GDATA(J,11)	01230
GDATA(NUNIT,9)= GDATA(J,9)/2	01240
GDATA(NUNIT,10)= GDATA(J,10)	01250
GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS	01260
GO TO 6000	01270
GDATA(NUNIT,7)= GDATA(J,7)+DE/2	01280
GDATA(NUNIT,8)= GDATA(J,8)-DN/2	01290
GDATA(NUNIT,11)= GDATA(J,11)	01300
GDATA(NUNIT,9)= GDATA(J,9)/2	01310
GDATA(NUNIT,10)= GDATA(J,10)	01320
GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS	01330
GO TO 6000	01340
GDATA(NUNIT,7)= GDATA(J,7)+DE/2	01350
IF (GDATA(J,11)) 160,160,161	01360
GDATA(NUNIT,8)= GDATA(J,8)-DN/2	01370
GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS	01380
GO TO 170	01390
GDATA(NUNIT,8)= GDATA(J,8)+DN/2	01400
GDATA(NUNIT,9)= GDATA(J,9)/2	


```

200  GDATA(NUNIT,10)= GDATA(J,10) MB 01410
      GDATA(NUNIT,11)= GDATA(J,11) MB 01420
      GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS MB 01430
      GO TO 6000 MB 01440
      IF(ABS(GDATA(7,8)-GDATA(NUNIT,8)) .LT. PRDATA(1,NUNIT,3,1)/3.) MB 01450
2    GO TO 500 MB 01460
      C MB 01470
      C MB 01480
      C MB 01490
      C MB 01500
      C MB 01510
      C MB 01520
      C MB 01530
      C MB 01540
      C MB 01550
      C MB 01560
      C MB 01570
      C MB 01580
      C MB 01590
      C MB 01600
      C MB 01610
      C MB 01620
      C MB 01630
      C MB 01640
      C MB 01650
      C MB 01660
      C MB 01670
      C MB 01680
      C MB 01690
      C MB 01700
      C MB 01710
      C MB 01720
      C MB 01730
      C MB 01740
      C MB 01750
      C MB 01760
      C MB 01770
      C MB 01780
      C MB 01790
      C MB 01800
      C MB 01810
      C MB 01820
      C MB 01830
      C MB 01840
      C MB 01850
      C MB 01860
      C MB 01870
      C MB 01880

      REGULAR OBJECTIVE

      SRES=7.0
      GDATA(NUNIT,20)= 0.0
      OLDDIS= GDATA(NUNIT,8)
      CALL TNGEN(GDATA(NUNIT,8)+PRDATA(1,NUNIT,3,1),PRDATA(1,NUNIT,3,4),
22) ,GDATA(NUNIT,13), (GDATA(NUNIT,13)+PRDATA(1,NUNIT,3,4)),
3GDATA(NUNIT,8))
      IF(GDATA(NUNIT,8) .GE. (GDATA(7,8)-GDATA(7,10))) GO TO 1623
      CALL TNGEN(PRDATA(1,NUNIT,5,1),PRDATA(1,NUNIT,5,2),PRDATA(1,NUNIT,5,3),
2,5,3), PRDATA(1,NUNIT,5,4), GDATA(NUNIT,10))
      CALL TNGEN(PRDATA(1,NUNIT,4,1),PRDATA(1,NUNIT,4,2),PRDATA(1,NUNIT,4,3),
2,4,3), PRDATA(1,NUNIT,4,4), GDATA(NUNIT,9))
      CALL UGEN(-.5236, .5236, GDATA(NUNIT,11))
      CALL TNGEN(GDATA(NUNIT,17),PRDATA(1,NUNIT,17,2),GDATA(NUNIT,3),
2GDATA(NUNIT,5), GDATA(NUNIT,7))
      GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS
      GO TO 6000
      GDATA(NUNIT,8)= OLDDIS
      GO TO 500

1623  BATTALION OBJECTIVE IS ON THE BRIGADE OBJECTIVE
      C
      C
      C
500  SRES=8.
      GDATA(NUNIT,20)= 1.0
      OLDDIS= GDATA(NUNIT,8)
      IF(NUNIT .EQ. 5) GO TO 501
      ISIDE= 2
      GO TO 502
      ISIDE= 1
      DE= GDATA(7,9)/4*COS(ABS(GDATA(7,11)))
      DN= GDATA(7,9)/4*SIN(ABS(GDATA(7,11)))
      GDATA(NUNIT,9)= GDATA(7,9)/2
      GDATA(NUNIT,10)= GDATA(7,10)
      GDATA(NUNIT,11)= GDATA(7,11)
      GO TO (550,560), ISIDE
      GDATA(NUNIT,7)= GDATA(7,7)-DE
      IF(GDATA(7,11) 551,551,552
550  GDATA(NUNIT,8)= GDATA(7,8)+DN
551  GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS
      GO TO 6000

```



```

552      GDATA(NUNIT,8)= GDATA(7,8)-DN
      GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS
      GO TO 6000
      C
      C
      C
560      BN IS ON THE RIGHT SIDE
      GDATA(NUNIT,7)= GDATA(7,7)+ DE
      IF(GDATA(7,11)) 561,561,562
561      GDATA(NUNIT,8)= GDATA(7,8)-DN
      GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS
      GO TO 6000
562      GDATA(NUNIT,8)= GDATA(7,8)+DN
      GDATA(NUNIT,19)= GDATA(NUNIT,8)-OLDDIS
6000      RETURN
      END

```

MB 01890
MB 01900
MB 01910
MB 01920
MB 01930
MB 01940
MB 01950
MB 01960
MB 01970
MB 01980
MB 01990
MB 02000
MB 02010
MB 02020
MB 02030

```

      SUBROUTINE IALOC
      COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
      COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

```

MB 02040
MB 02050
MB 02060
MB 02070
MB 02080
MB 02090
MB 02100
MB 02110
MB 02120
MB 02130
MB 02140
MB 02150
MB 02160
MB 02170
MB 02180
MB 02190
MB 02200
MB 02210
MB 02220
MB 02230
MB 02240
MB 02250
MB 02260
MB 02270
MB 02280
MB 02290
MB 02300
MB 02310
MB 02320
MB 02330

```

      LOCATE BATTERY CENTERS FIRST
      DO 100 I=1,3
      IF (I .EQ. 1) K=5
      IF (I .EQ. 2) K=7
      IF (I .EQ. 3) K=6
      CALL TNGEN(GDATA(K,13)-PRDATA(2,I,5,1),PRDATA(2,I,5,2),
2(GDATA(K,13)-RMAX),GDATA(K,13),ARDATA(I,7,8))
      CALL TNGEN(GDATA(K,12),PRDATA(2,I,4,2),GDATA(K,3),GDATA(K,5),
2ARDATA(I,7,7))

```

MB 02040
MB 02050
MB 02060
MB 02070
MB 02080
MB 02090
MB 02100
MB 02110
MB 02120
MB 02130
MB 02140
MB 02150
MB 02160
MB 02170
MB 02180
MB 02190
MB 02200
MB 02210
MB 02220
MB 02230
MB 02240
MB 02250
MB 02260
MB 02270
MB 02280
MB 02290
MB 02300
MB 02310
MB 02320
MB 02330

```

      FIND THE AZIMUTH OF LAY
      FIND CENTER OF MASS OF INFANTRY COMPANY TARGETS FIRST

```

MB 02040
MB 02050
MB 02060
MB 02070
MB 02080
MB 02090
MB 02100
MB 02110
MB 02120
MB 02130
MB 02140
MB 02150
MB 02160
MB 02170
MB 02180
MB 02190
MB 02200
MB 02210
MB 02220
MB 02230
MB 02240
MB 02250
MB 02260
MB 02270
MB 02280
MB 02290
MB 02300
MB 02310
MB 02320
MB 02330

```

      CMN=0.0
      CME=0.0
      ICOUNT=0
      DO 200 I=1,250
      IF(TGT(I,1).EQ. 0) GO TO 202
      DO 201 J=5,7
      IF (TGT(I,2) .EQ. J) GO TO 200
      CONTINUE

```

MB 02040
MB 02050
MB 02060
MB 02070
MB 02080
MB 02090
MB 02100
MB 02110
MB 02120
MB 02130
MB 02140
MB 02150
MB 02160
MB 02170
MB 02180
MB 02190
MB 02200
MB 02210
MB 02220
MB 02230
MB 02240
MB 02250
MB 02260
MB 02270
MB 02280
MB 02290
MB 02300
MB 02310
MB 02320
MB 02330

MB	02340
MB	02350
MB	02360
MB	02370
MB	02371
MB	02380
MB	02390
MB	02400
MB	02410
MB	02420
MB	02430
MB	02431
MB	02440
MB	02450
MB	02460
MB	02470
MB	02480
MB	02490
MB	02500
MB	02510
MB	02520
MB	02530
MB	02540
MB	02550
MB	02560

MB 02570
MB 02580
MB 02590
MB 02600
MB 02610
MB 02620
MB 02630
MB 02640
MB 02650
MB 02660
MB 02670
MB 02680
MB 02690
MB 02700
MB 02710
MB 02720
MB 02730
MB 02740
MB 02750
MB 02760
MB 02770

J=4	MB	02780
GO TO 1211	MB	02790
IK=1	MB	02800
J=7	MB	02810
GO TO 1211	MB	02820
DO 1100 KUNIT=IK,J	MB	02830
IF(GDATA(KUNIT,2) .EQ. 1) ISTAGE=1	MB	02840
IF(GDATA(KUNIT,2) .GT. 1) ISTAGE=2	MB	02850
UNIT=KUNIT	MB	02860
DETERMINE THE NUMBER OF TARGETS	MB	02870
	MB	02880
	MB	02890
GO TO (600,601),ISTAGE	MB	02900
CALL EVENT (KUNIT,6,NTGTS)	MB	02910
GO TO 1000	MB	02920
CALL EVENT (KUNIT,7,NTGTS)	MB	02930
ENTER THIS POINT WITH THE NUMBER OF TARGETS	MB	02940
	MB	02950
INITIAL FIRE PLAN STAGE =1	MB	02960
	MB	02970
	MB	02980
CONTINUE	MB	02990
IF(NTGTS .EQ. 0) GO TO 6820	MB	03000
DO 1100 I=1,NTGTS	MB	03010
ITGT=ITGT+1	MB	03020
STGT=ITGT	MB	03030
FIND STORAGE VECTOR IN TARGET HISTORY ARRAY	MB	03040
	MB	03050
	MB	03060
CALL HARRAY(NUM)	MB	03070
TGT(NUM,1)= STGT	MB	03080
TGT(NUM,2)= UNIT	MB	03090
GO TO (1700,1800),ISTAGE	MB	03100
CALL EVENT (KUNIT,8,TYPE)	MB	03110
GO TO (1710,1720,1730), TYPE	MB	03120
TARGET IS PREP	MB	03130
	MB	03140
	MB	03150
TGT(NUM,7)= 1.0	MB	03160
CALL EVENT (KUNIT,10,MODE)	MB	03170
CALL TGIGEN(KUNIT,MODE,NUM)	MB	03180
GO TO 1100	MB	03190
TARGET IS SCHEDULED	MB	03200
	MB	03210
	MB	03220
TGT(NUM,5)= 1.0	MB	03230
CALL EVENT (KUNIT,12,MODE)	MB	03240
CALL TGIGEN(KUNIT,MODE,NUM)	MB	03250

C	GO TO 1100	MB	03260
C	TARGET IS ON CALL	MB	03270
C		MB	03280
1730	TGT(NUM,6)= 1.0	MB	03290
	CALL EVENT (KUNIT,14,MODE)	MB	03300
	CALL TGTGEN(KUNIT,MODE,NUM)	MB	03310
	GO TO 1100	MB	03320
		MB	03330
C		MB	03340
C	UNIT IS NOT IN FULL PLANNING STATE	MB	03350
C		MB	03360
1800	CALL EVENT(KUNIT,9,TYPE)	MB	03370
	GO TO (1810,1820,1830),TYPE	MB	03380
C		MB	03390
C	TARGET IS A PREPARATORY TARGET	MB	03400
C		MB	03410
1810	TGT(NUM,7)= 1.0	MB	03420
	CALL EVENT(KUNIT,11,MODE)	MB	03430
	CALL TGTGEN(KUNIT,MODE,NUM)	MB	03440
	GO TO 1100	MB	03450
C		MB	03460
C	TARGET IS SCHEDULED	MB	03470
C		MB	03480
1820	TGT(NUM,5)= 1.0	MB	03490
	CALL EVENT(KUNIT,13,MODE)	MB	03500
	CALL TGTGEN(KUNIT,MODE,NUM)	MB	03510
	GO TO 1100	MB	03520
C		MB	03530
C	TARGET IS ON CALL	MB	03540
C		MB	03550
1830	TGT(NUM,6)= 1.0	MB	03560
	CALL EVENT(KUNIT,15,MODE)	MB	03570
	CALL TGTGEN(KUNIT,MODE,NUM)	MB	03580
1100	CONTINUE	MB	03590
6820	CONTINUE	MB	03600
	IF (K .EQ. 6) GO TO 6012	MB	03610
	GO TO (6000,6000,6000,6000,6000,6000,5009,5010,6000),NCOUNT	MB	03620
5009	IK=5	MB	03630
	J=5	MB	03640
	K=6	MB	03650
	GO TO 1211	MB	03660
5010	IK=6	MB	03670
	J=6	MB	03680
	K=6	MB	03690
6012	GO TO 1211	MB	03700
6000	CONTINUE	MB	03710
	IF (IROW .EQ. 0) GO TO 6001	MB	03720
	DO 2000 I=1,50	MB	03730

2000
6001

EVLIST(IROW,I)= 0.0
RETURN
END

MB 03740
MB 03750
MB 03760

C

SUBROUTINE TGTGEN(NUNIT,MODE,NUM)

MC 00010
MC 00020
MC 00030
MC 00040
MC 00050
MC 00060
MC 00070
MC 00080
MC 00090
MC 00100
MC 00110
MC 00120
MC 00130
MC 00140
MC 00150
MC 00160
MC 00170
MC 00180
MC 00190
MC 00200
MC 00210
MC 00220
MC 00230
MC 00240
MC 00250
MC 00260
MC 00270
MC 00280
MC 00290
MC 00300
MC 00310
MC 00320
MC 00330
MC 00340
MC 00350
MC 00360
MC 00370
MC 00380
MC 00390
MC 00400
MC 00410
MC 00420
MC 00430

REAL GDATA, PRDATA, TGT
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)

C
C
C

DETERMINE THE BOUNDS

XUL= -GDATA(NUNIT,9)/2.
YUL= GDATA(NUNIT,10)/2.
XUR= GDATA(NUNIT,9)/2.
YUR= GDATA(NUNIT,10)/2.
XLL= XUL
YLL= -GDATA(NUNIT,10)/2.
XLR= XUR
YLR= YLL

C
C
C

TRANSFORM THE COORDINATES

A= GDATA(NUNIT,11)
XULT= XUL*COS(A)+YUL*SIN(A)+GDATA(NUNIT,7)
YULT= YUL*COS(A)-XUL*SIN(A)+GDATA(NUNIT,8)
XURT= XUR*COS(A)+YUR*SIN(A)+GDATA(NUNIT,7)
YURT= YUR*COS(A)-XUR*SIN(A)+GDATA(NUNIT,8)
XLLT= XLL*COS(A)+YLL*SIN(A)+GDATA(NUNIT,7)
YLLT= YLL*COS(A)-XLL*SIN(A)+GDATA(NUNIT,8)
XLR= XLR*COS(A)+YLR*SIN(A)+GDATA(NUNIT,7)
YLR= YLR*COS(A)-XLR*SIN(A)+GDATA(NUNIT,8)
YLRM1= AMAX1(YULT,YURT,YLLT,YLRT)
YLRM2= AMIN1(YULT,YURT,YLLT,YLRT)
XLRM1= AMIN1(XULT,XURT,XLLT,XLRT)
XLRM2= AMAX1(XULT,XURT,XLLT,XLRT)
GO TO (100,200,300),MODE

C
C
C
100
C

TARGET IS ON THE OBJECTIVE

CALL UGEN(XLIM1,XLIM2,TGT(NUM,3))
CALL UGEN(YLIM2,YLIM1,TGT(NUM,4))
GO TO 600

C	2400	MC	00900
C		MC	00910
C		MC	00920
C		MC	00930
C		MC	00940
		MC	00950
		MC	00960
		MC	00970
		MC	00980
		MC	00990
		MC	01000
		MC	01010
		MC	01020
		MC	01030
		MC	01040
		MC	01050
		MC	01060
		MC	01070
		MC	01080
		MC	01090
		MC	01100
		MC	01110
		MC	01120
		MC	01130
		MC	01140
		MC	01150
		MC	01160
		MC	01170
		MC	01180
		MC	01190
		MC	01200
		MC	01210
		MC	01220
		MC	01230
		MC	01240
		MC	01250
		MC	01260
		MC	01270
		MC	01280
		MC	01290
		MC	01300
		MC	01310
		MC	01320
		MC	01330
		MC	01340
		MC	01350
		MC	01360
		MC	01370


```

NOW THE PREP
DETERMINE THE UNIT CAPABILITIES
DO 300 I=1,250
IF (TGT(I,8) .NE. 0) GO TO 300
I TYPE= TGT(I,7)+1
GO TO (300,600), I TYPE
DO 301 J=1,3
IF (ARDATA(J,7,2) .EQ. 3) GO TO 301
IF (RANGE(TGT(I,3),TGT(I,4),J) .LT. RMAX) TGT(I,14+J)= 1.0
CONTINUE
DO 1705 I=1,250
I TYPE= TGT(I,7)+ 1
GO TO (1705,800), I TYPE
SUM=0.0
DO 1200 J= 1,3
SUM= SUM+ TGT(I,J+14)
TGT(I,18) = SUM
CONTINUE
SUM1= 0.0
SUM3= 0.0
SUM2= 0.0

DETERMINE THE NUMBER OF TARGETS EACH UNIT CAN HIT
DO 2600 IJ=1,250
IF (TGT(IJ,15) .EQ. 1) SUM1=SUM1+1
IF (TGT(IJ,16) .EQ. 1) SUM2= SUM2+1
IF (TGT(IJ,17) .EQ. 1) SUM3= SUM3+1
CONTINUE
NUM(1)= SUM1
NUM(2)= SUM2
NUM(3)= SUM3
DO 1706 I=1,250
NSUM= TGT(I,18)+1
GO TO (1706,1707,1708,1709), NSUM

ONE UNIT ONLY CAN REACH THE TARGET
DO 1216 J=1,3
IF (TGT(I,J+14) .EQ. 1 .AND. NUM(J) .GT. 0) GO TO 1215
CONTINUE
DO 8610 JX=1,40
TGT(I,JX)=0.0

```

C	1707	MC	01310
C		MC	01320
C		MC	01330
		MC	01340
		MC	01350
		MC	01360
		MC	01370

1215	GO TO 1706	MC 01380
	TGT(I,11)= 1.*J	MC 01390
	NUM(J)=NUM(J)-1	MC 01400
	GO TO 1706	MC 01410
C		MC 01420
C	TWO UNITS CAN HIT THE TARGET	MC 01430
C		MC 01440
1708	ICOUNT=0	MC 01450
	IR=0	MC 01460
	DO 7010 JX=1,3	MC 01470
7010	CK(JX)=0	MC 01480
	DO 1225 K=1,3	MC 01490
	IF (TGT(I,K+14) .EQ.1 .AND. NUM(K).GT.0) GO TO 1226	MC 01500
	GO TO 1225	MC 01510
1226	CK(K)=1	MC 01520
	ICOUNT= ICOUNT+1	MC 01530
1225	CONTINUE	MC 01540
	IF (ICOUNT .EQ. 0) GO TO 1275	MC 01550
	GO TO (6300,6301),ICOUNT	MC 01560
6300	DO 6302 IK=1,3	MC 01570
	IF (CK(IK) .NE. 0) NUNIT=IK	MC 01580
6302	CONTINUE	MC 01590
	TGT(I,11)= 1.*NUNIT	MC 01600
	NUM(NUNIT)= NUM(NUNIT)-1	MC 01610
	GO TO 1706	MC 01620
1275	CONTINUE	MC 01630
	DO 1276 JX=1,40	MC 01640
1276	TGT(I,JX)= 0.0	MC 01650
	GO TO 1706	MC 01660
6301	DO 6900 JX1=1,3	MC 01670
	DO 6900 JX2= 1,3	MC 01680
	IF (JX1 .EQ. JX2) GO TO 6900	MC 01690
	IF (CK(JX1) .EQ. 1 .AND. CK(JX2) .EQ. 1) GO TO 6901	MC 01700
6900	CONTINUE	MC 01710
6901	CONTINUE	MC 01720
	IF (NUM(JX1) .LT. NUM(JX2)) GO TO 6902	MC 01730
	IF (NUM(JX1) .GT. NUM(JX2)) GO TO 6903	MC 01740
C		MC 01750
C	NUMBER OF TARGETS ARE EQUAL	MC 01760
C		MC 01770
	CALL UNIF(RNNR)	MC 01780
	IF (RNNR .LT. .5) IR=JX1	MC 01790
	IF (RNNR .GE. .5) IR=JX2	MC 01800
	TGT(I,11)= IR*.1	MC 01810
	NUM(JX1)= NUM(JX1)-1	MC 01820
	NUM(JX2)= NUM(JX2)-1	MC 01830
	GO TO 1706	MC 01840
6902	TGT(I,11)= JX2*.1	MC 01850



6903	NUM(JX1)= NUM(JX1)-1	MC	01860
	NUM(JX2)= NUM(JX2)-1	MC	01870
	GO TO 1706	MC	01880
	TGT(I,11)= JX1*1.	MC	01890
	NUM(JX1)= NUM(JX1)-1	MC	01900
	NUM(JX2)= NUM(JX2)-1	MC	01910
	GO TO 1706	MC	01920
C		MC	01930
C	ALL UNITS CAN HIT	MC	01940
C		MC	01950
1709	ICOUNT=0	MC	01960
	DO 2000 L=1,3	MC	01970
	IF(NUM(L) .GT. 0) ICOUNT=ICOUNT+1	MC	01980
2000	CONTINUE	MC	01990
	IF(ICOUNT .EQ. 0) GO TO 1275	MC	02000
1901	GO TO (1707,1708,1995),ICOUNT	MC	02010
C		MC	02020
C	FIND MIN NUM	MC	02030
C		MC	02040
1995	MIN=100	MC	02050
	DO 1996 L=1,3	MC	02060
	IF (NUM(L) .LT. MIN) GO TO 1997	MC	02070
1996	CONTINUE	MC	02080
	GO TO 1998	MC	02090
1997	MIN= NUM(L)	MC	02100
	N=L	MC	02110
	GO TO 1996	MC	02120
1998	TGT(I,11)= 1.*N	MC	02130
	DO 1999 L=1,3	MC	02140
1999	NUM(L)= NUM(L)-1	MC	02150
1706	CONTINUE	MC	02160
C		MC	02170
C	REZERO TARGET FLAGS	MC	02180
C		MC	02190
	DO 2700 I=1,250	MC	02200
	DO 2700 J=14,18	MC	02210
	TGT(I,J)= 0.0	MC	02220
2700		MC	02230
C	STACK THE EVENT LIST FOR ALL SCHEDULED TARGETS	MC	02240
C		MC	02250
C	DO 2500 I=1,250	MC	02260
	IF (TGT(I,5) .EQ. 0 .OR. TGT(I,39) .EQ. 0) GO TO 2500	MC	02270
	CALL EARRAY(IOPEN)	MC	02280
	EVLISIT(IOPEN,1)=TGT(I,8)-60	MC	02290
	EVLISIT(IOPEN,2)=1.	MC	02300
	EVLISIT(IOPEN,3)=TGT(I,1)	MC	02310
	EVLISIT(IOPEN,4)= 1.*I	MC	02320
	EVLISIT(IOPEN,6)= TGT(I,3)	MC	02330

MC 02340
MC 02350
MC 02360
MC 02370
MC 02380
MC 02390
MC 02400
MC 02410
MC 02420
MC 02430
MC 02440
MC 02450
MC 02460
MC 02470
MC 02480
MC 02490
MC 02500
MC 02510
MC 02520
MC 02530
MC 02540
MC 02550
MC 02560
MC 02570
MC 02580
MC 02590
MC 02600
MC 02610
MC 02620
MC 02630
MC 02640
MC 02650
MC 02660
MC 02670
MC 02680
MC 02690
MC 02700
MC 02710
MC 02720
MC 02730
MC 02740
MC 02750
MC 02760
MC 02770
MC 02780

```

EVL IST(IOPEN,7)= TGT(I,4)
EVL IST(IOPEN,8)= TGT(I,2)
EVL IST(IOPEN,9)= TGT(I,11)
EVL IST(IOPEN,16)= 1.0
EVL IST(IOPEN,17)= 1.0
EVL IST(IOPEN,21)= 4.0
EVL IST(IOPEN,32)= TGT(I,3)
EVL IST(IOPEN,33)= TGT(I,4)
EVL IST(IOPEN,36)= TGT(I,3)
EVL IST(IOPEN,37)= TGT(I,4)
TGT(I,39)= 0.0
TGT(I,20)= IOPEN*1.
CONTINUE

```

2500
C
C
C

DETERMINE TIMES FOR PREP TARGETS AND STACK EVENT LIST

```

DO 2800 I=1,3
TIME=QTIME
IF 2701 J=1,250
IF (TGT(J,11) .EQ. 0 .OR. TGT(J,39) .EQ. 0) GO TO 2701
IF (TGT(J,11) .NE. 1) GO TO 2701
TIME=TIME-180.
TGT(J,8)=0.0
CALL EARRAY(IO)
EVL IST(IO,1)= 1.0
EVL IST(IO,2)= 1.0
EVL IST(IO,17)= TGT(J,1)
EVL IST(IO,3)= 1.0
EVL IST(IO,4)= 1.*J
EVL IST(IO,6)= TGT(J,3)
EVL IST(IO,7)= TGT(J,4)
EVL IST(IO,8)= TGT(J,2)
EVL IST(IO,9)= TGT(J,11)
EVL IST(IO,16)= 1.0
EVL IST(IO,21)= 2.0
EVL IST(IO,32)= TGT(J,3)
EVL IST(IO,33)= TGT(J,4)
EVL IST(IO,36)= TGT(J,3)
EVL IST(IO,37)= TGT(J,4)
TGT(J,20)= IO*1.
CONTINUE
CONTINUE
RETURN
END

```

2701
2800

C		SUBROUTINE MOARTY	MC	02790
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,		MC	02800
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),		MC	02810
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN		MC	02820
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,		MC	02830
	2XTLETH,STAT(20,4)		MC	02840
C			MC	02850
	DIMENSION USAT(3,3)		MC	02860
	NCOUNT=0		MC	02870
	RC= 2.*RMAX/3.		MC	02880
C			MC	02890
C		IF UNIT IS GREATER THAN RMAX BACK OF FRONT LINE MOVE IT	MC	02900
C			MC	02910
	DO 2100 I=1,3		MC	02920
	IF((GDATA(7,13)-ARDATA(I,7,8)) .GE. RMAX) CALL MAUNIT(I)		MC	02930
2100	CONTINUE		MC	02940
C			MC	02950
C		DETERMINE IF ANY UNITS ARE ALREADY MOVING (RESCHEDULE DECISION)	MC	02960
C			MC	02970
	DO 100 I=1,3		MC	02980
	IF (ARDATA(I,7,2) .EQ. 3.0) GO TO 101		MC	02990
100	CONTINUE		MC	03000
C			MC	03010
C		DETERMINE IF ANY UNIT IS GREATER THAN 2/3 MAX RANGE BACK OF FORWARD	MC	03020
C		ELEMENTS	MC	03030
	DO 200 I=1,3		MC	03040
	IF (I .EQ. 1) IS=5		MC	03050
	IF (I .EQ. 2) IS=7		MC	03060
	IF (I .EQ. 3) IS=6		MC	03070
	UN=1		MC	03080
	USAT (I,1)= UN		MC	03090
	USAT (I,2)= ARDATA (I,7,2)		MC	03100
	USAT(I,3)= GDATA(IS,13)-ARDATA(I,7,8)		MC	03110
200	CONTINUE		MC	03120
	IF(USAT(1,3) .LT. RC .AND. USAT(2,3) .LT. RC .AND. USAT(3,3)		MC	03130
	2.LT. RC) GO TO 102		MC	03140
401	RMIN= AMAX1(USAT(1,3),USAT(2,3),USAT(3,3))		MC	03150
	IF (RMIN .EQ. 0) GO TO 103		MC	03160
	DO 300 N=1,3		MC	03170
	IF (USAT(N,3) .EQ. RMIN) NUN= N		MC	03180
300	CONTINUE		MC	03190
	IF (USAT(NUN,2) .EQ.1) GO TO 400		MC	03200
	USAT(NUN,3)= 0.0		MC	03210
	GO TO 401		MC	03220
101	EVLIST(IROW,1)= CTIME+600		MC	03230
	GO TO 1700		MC	03240
			MC	03250
			MC	03260

MC 03270
MC 03280
MC 03290
MC 03300
MC 03310
MC 03320
MC 03330

102 EVLIST(IROW,1)= CTIME+ 900
GO TO 1700
103 EVLIST(IROW,1)= CTIME+ 300
400 CALL MAUNIT(NUN)
GO TO 102
1700 RETURN
END

MD 00010
MD 00020
MD 00030
MD 00040
MD 00050
MD 00060
MD 00070
MD 00080
MD 00090
MD 00100
MD 00110
MD 00120
MD 00130
MD 00140
MD 00150
MD 00160
MD 00170
MD 00180
MD 00190
MD 00200
MD 00210
MD 00220
MD 00230
MD 00240
MD 00250
MD 00260
MD 00270
MD 00280
MD 00290
MD 00300
MD 00310
MD 00320
MD 00330
MD 00340
MD 00350
MD 00360
MD 00370
MD 00380
MD 00390

SUBROUTINE MAUNIT(NUN)
DIMENSION USAT(3,3)
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

MOVE UNIT NUN

IF (NUN.EQ. 1) ID= 5
IF (NUN.EQ. 2) ID= 7
IF (NUN.EQ. 3) ID= 6

FIND NEW POSITION

OE= ARDATA(NUN,7,7)
ON= ARDATA(NUN,7,8)
SMN= GDATA(ID,13) -PRDATA(2,NUN,5,1)
CALL TNGEN(SMN,PRDATA(2,NUN,5,2),(GDATA(ID,13)-RMAX),
2GDATA(ID,13),ARDATA(NUN,7,8))
CALL TNGEN(GDATA(ID,17),PRDATA(2,NUN,4,2),GDATA(ID,3),
2GDATA(ID,5),ARDATA(NUN,7,7))

FIND AZIMUTH OF FIRE

IF (NUN .EQ. 2) GO TO 500
IF (NUN .EQ. 3) GO TO 501
U1= 1.0
U2= 2.0
GO TO 502
U1= 3.
U2= 4.
CME= 0.0
CMN= 0.0
DO 701 I=1,250
IF (TGT(I,2) .EQ. U1 .OR. TGT(I,2) .EQ. U2 .AND. TGT(I,5) .EQ. 1
2.AND. TGT(I,8) .GT. (CTIME+900)) GO TO 702

501

502

701	CONTINUE	MD 00400
	IF (CME .EQ. 0.0 .AND. CMN .EQ. 0.0) GO TO 800	MD 00410
702	GO TO 703	MD 00420
	CME = CME + TGT(I,3)	MD 00430
	CMN = CMN + TGT(I,4)	MD 00440
	NCOUNT = NCOUNT + 1	MD 00450
703	GO TO 701	MD 00460
	SLD = CME/NCOUNT - ARDATA(NUN,7,7)	MD 00470
	SDD = CMN/NCOUNT - ARDATA(NUN,7,8)	MD 00480
	ARG = SLD/SDD	MD 00490
	ANGLE = ATAN(ARG)	MD 00500
	IF (ANGLE .LE. 0) ARDATA(NUN,7,6) = 6.2832 - ABS(ANGLE)	MD 00510
	IF (ANGLE .GT. 0) ARDATA(NUN,7,6) = ANGLE	MD 00520
	GO TO 700	MD 00530
800	ARDATA(NUN,7,6) = 0.0	MD 00540
500	GO TO 700	MD 00550
	CMN = 0.0	MD 00560
	CME = 0.0	MD 00570
	DO 1100 I=1,250	MD 00580
1100	IF (TGT(I,5) .EQ. 1 .AND. TGT(I,8) .GT. (CTIME+900)) GO TO 1200	MD 00590
	CONTINUE	MD 00600
	IF (CME .EQ. 0.0 .AND. CMN .EQ. 0.0) GO TO 800	MD 00610
1200	GO TO 703	MD 00620
	CMN = CMN + TGT(I,4)	MD 00630
	CME = CME + TGT(I,3)	MD 00640
	NCOUNT = NCOUNT + 1	MD 00650
700	GO TO 1100	MD 00660
	ARDATA(NUN,7,2) = 3	MD 00670
	CALL UGEN(1.0,2.0,RESULT)	MD 00680
	DIS = SQRT((ARDATA(NUN,7,3) - OE)**2 + (ARDATA(NUN,7,4) - ON)**2) *	MD 00690
	2RESULT	MD 00700
	CALL TNGEN(PRDATA(2,NUN,7,1), PRDATA(2,NUN,7,2), PRDATA(2,NUN,7,3),	MD 00710
	2PRDATA(2,NUN,7,4), RATE)	MD 00720
	CALL TNGEN(PRDATA(2,NUN,6,1), PRDATA(2,NUN,6,2), PRDATA(2,NUN,6,3),	MD 00730
	2PRDATA(2,NUN,6,4), TMOD)	MD 00740
	CALL TNGEN(PRDATA(2,NUN,8,1), PRDATA(2,NUN,8,2), PRDATA(2,NUN,8,3),	MD 00750
	2PRDATA(2,NUN,8,4), TEMPL)	MD 00760
	TMOV = DIS * 3600 / (1000. * RATE)	MD 00770
	CALL EARRAY(IOPEN)	MD 00780
	EVLIST(IOPEN,1) = CTIME + TMOV + TMOD + TEMPL	MD 00790
	EVLIST(IOPEN,2) = 9.0	MD 00800
	EVLIST(IOPEN,3) = NUN * 1.0	MD 00810
1700	RETURN	MD 00820
	END	MD 00830


```

C          SUBROUTINE WPLOC (NUNIT)
C          COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
C          COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)
C          DIMENSION DEP(6), SLAT(6), THETA (6), DIS(6)
C
C          FIND THE ACTUAL BATTERY CENTER
C
C          CALL TNGEN(ARDATA(NUNIT,7,7),PRDATA(2,NUNIT,9,2),
2(ARDATA(NUNIT,7,7)-PRDATA(2,NUNIT,9,4)),(ARDATA(NUNIT,7,7)+
3PRDATA(2,NUNIT,9,4)),ARDATA(NUNIT,7,3))
C          CALL TNGEN(ARDATA(NUNIT,7,8),PRDATA(2,NUNIT,9,2),
2AMAX1((ARDATA(NUNIT,7,8)-RMAX),(ARDATA(NUNIT,7,8)-PRDATA(2,NUNIT,
39,4))),AMIN1(GDATA(7,13),(ARDATA(NUNIT,7,8)+PRDATA(2,NUNIT,9,4))),
4ARDATA(NUNIT,7,4))
C
C          COMPUTE THE ERROR
C
C          DO 3701 I=9,10
C          ARDATA(NUNIT,7,I)= ARDATA(NUNIT,7,(I-2))-ARDATA(NUNIT,7,(I-6))
C          CONTINUE
3701
C          POSITION THE WEAPONS
C
C          DO 100 I=1,6
C          CALL UGEN (PRDATA(2,NUNIT,(I+9),1),PRDATA(2,NUNIT,(I+9),2),
2DEP(I))
C          CALL UGEN (PRDATA (2,NUNIT,(I+9),3),PRDATA(2,NUNIT,(I+9),4),
2 SLAT(I))
C          DO 700 I=1,NGUNS
C          ANGLE= ARDATA(NUNIT,7,6)
C          ARDATA(NUNIT,I,3)= -DEP(I)*SIN(ANGLE)+SLAT(I)*COS(ANGLE)+ARDATA
2(NUNIT,7,3)
C          ARDATA(NUNIT,I,4)= DEP(I)*COS(ANGLE)+SLAT(I)*SIN(ANGLE)+ARDATA
2(NUNIT,7,4)
C          CONTINUE
700
C          ALTER UNIT STATUS LIGHTS
C
C          ARDATA(NUNIT,7,2)= 1.0
C          IF (IROW .EQ. 0) GO TO 6000
2000
C          DO 2700 I=1,50
C          EVLIST(IROW,I)= 0.0
2700
C          RETURN
6000

```



```

END
MD 01320

C
SUBROUTINE TOGEN
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLST(250,50),ARDATA(4,7,16),IRON,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C
C DETERMINE THE NUMBER OF UNITS NOT ENGAGED AND SELECT A UNIT
C
JCOUNT=0
DO 1600 I=1,4
IF(GDATA(I,16).EQ.1) GO TO 1600
IF((CTIME-GDATA(I,15)).GT.2700.AND.GDATA(I,2).EQ.4) GO TO
21600
IF(GDATA(I,2).EQ.1) GO TO 1600
IF(GDATA(I,2).GT.4) GO TO 1600
GO TO 120
CONTINUE
GO TO 125
JCOUNT=JCOUNT+1
GO TO 1600
120 JCOUNT=JCOUNT+1
125 NUM=JCOUNT+1
IF(NUM.GT.1) ITGT=ITGT+1
GO TO (5000,700,800,900,1000),NUM
C
C ONE UNIT NOT ENGAGED
C
DO 160 I=1,4
IF(GDATA(I,16).EQ.0) GO TO 500
CONTINUE
NUNIT=I
GO TO 4000
C
C TWO UNITS NOT ENGAGED
C
CALL UNIF(RNNR)
IF(RNNR.LE.5) GO TO 801
NUM=2
GO TO 802
NUM=1
ICOUNT=0
DO 803 I=1,4
IF(GDATA(I,16).NE.0) GO TO 803
ICOUNT=ICOUNT+1
801
802
800

```


803	IF(ICOUNT .EQ. NUM) GO TO 804	MD 01780
804	CONTINUE	MD 01790
C	NUNIT=1	MD 01800
C	GO TO 4000	MD 01810
C		MD 01820
900	THREE UNITS NOT ENGAGED	MD 01830
		MD 01840
	CALL UNIF(RNNR)	MD 01850
	IF(RNNR .LE. .333) GO TO 901	MD 01860
	IF(RNNR .LE. .667) GO TO 902	MD 01870
	NUM=1	MD 01880
	GO TO 903	MD 01890
901	NUM=2	MD 01900
	GO TO 903	MD 01910
902	NUM=3	MD 01920
	GO TO 903	MD 01930
903	ICOUNT=0	MD 01940
	DO 1200 I=1,4	MD 01950
	IF(GDATA(I,16) .EQ. 1) GO TO 1200	MD 01960
	IF((CTIME-GDATA(I,15)) .GT. 2700 .AND. GDATA(I,2) .EQ. 4) GO TO	MD 01970
	21200	MD 01980
	IF(GDATA(I,2) .EQ. 1) GO TO 1200	MD 01990
	IF(GDATA(I,2) .GT. 4) GO TO 1200	MD 02000
	ICOUNT=ICOUNT+1	MD 02010
	IF(ICOUNT .EQ. NUM) GO TO 1201	MD 02020
	CONTINUE	MD 02030
1200	NUNIT=1	MD 02040
1201	GO TO 4000	MD 02050
C		MD 02060
C	ALL UNITS ARE FREE	MD 02070
C		MD 02080
1000	CALL UNIF(RNNR)	MD 02090
	IF(RNNR .LE. .25) GO TO 1001	MD 02100
	IF(RNNR .LE. .5) GO TO 1002	MD 02110
	IF(RNNR .LE. .75) GO TO 1003	MD 02120
	NUNIT=4	MD 02130
	GO TO 4000	MD 02140
1001	NUNIT=1	MD 02150
	GO TO 4000	MD 02160
1002	NUNIT=2	MD 02170
	GO TO 4000	MD 02180
1003	NUNIT=3	MD 02190
	GO TO 4000	MD 02200
C		MD 02210
C	DETERMINE THE LOCATION OF THE TARGET	MD 02220
C		MD 02230
4000	CALL HARRY(I)	MD 02240
	TGT(I,1)=1.*ITGT	MD 02250


```

CC C      DETERMINE THE ACTUAL TARGET LOCATION
CC C      CALL UGEN(GDATA(NUNIT,3),GDATA(NUNIT,5),TGT(I,3))
CC C      CALL UGEN(GDATA(NUNIT,13),(GDATA(NUNIT,13)+500),TGT(I,4))
CC C      COMPUTE THE ANGLE FROM FPC TO TARGET
CC C      ARG= (TGT(I,3)-GDATA(NUNIT,12))/(TGT(I,4)-GDATA(NUNIT,13))
CC C      ANGLE= ATAN(ARG)
CC C      COMPUTE RANGE FROM FPC TO TARGET
CC C      TRAN= DIST(TGT(I,3),TGT(I,4),GDATA(NUNIT,12),GDATA(NUNIT,13))
CC C      DETERMINE LOCATION IN FO COORDINATE SYSTEM
CC C      COMPUTE ERROR VARIANCES
CC C      VARE= PRDATA(2,5,2,1)+PRDATA(2,5,2,2)*TRAN
CC C      VARN= PRDATA(2,5,3,1)+PRDATA(2,5,3,2)*TRAN
CC C      CALL TNGEN(0.0,VARE,-PRDATA(2,5,2,4),PRDATA(2,5,2,4),TGE)
CC C      CALL TNGEN(0.0,VARN,-PRDATA(2,5,3,4),PRDATA(2,5,3,4),TGN)
CC C      TRANSFORM COORDINATES TO BASE COORDINATE SYSTEM
CC C      CN= TGT(I,4)+ TGN*COS(ANGLE)+TGE*SIN(ANGLE)
CC C      CE= TGT(I,3)+ TGE*COS(ANGLE)-TGN*SIN(ANGLE)
CC C      ENTER DATA IN TARGET ARRAY
CC C      TGT(I,9)= 1.0
CC C      TGT(I,10)= CTIME
CC C      TGT(I,21)= 1.*NUNIT
CC C      TGT(I,21)= TGT(I,3)-CE
CC C      TGT(I,22)= TGT(I,4)-CN
CC C      SET UP EVENT IN EVENT CHAIN
CC C      DETERMINE TIME FOR MISSION PREPARATION BY FO
CC C      CALL TNGEN(PRDATA(2,4,2,1),PRDATA(2,4,2,2),PRDATA(2,4,2,3),
400 2PRDATA(2,4,2,4),PTIME)
CC C      DETERMINE THE TIME REQUIRED FOR TRANSMISSION TO FOC
CC C      CALL TNGEN(PRDATA(2,4,3,1),PRDATA(2,4,3,2),PRDATA(2,4,3,3),
MD 2PRDATA(2,4,3,4),TTIME)
MD 02260
MD 02270
MD 02280
MD 02290
MD 02300
MD 02310
MD 02320
MD 02330
MD 02340
MD 02350
MD 02360
MD 02370
MD 02380
MD 02390
MD 02400
MD 02410
MD 02420
MD 02430
MD 02440
MD 02450
MD 02460
MD 02470
MD 02480
MD 02490
MD 02500
MD 02510
MD 02520
MD 02530
MD 02540
MD 02550
MD 02560
MD 02570
MD 02580
MD 02590
MD 02600
MD 02610
MD 02620
MD 02630
MD 02640
MD 02650
MD 02660
MD 02670
MD 02680
MD 02690
MD 02700
MD 02710
MD 02720
MD 02730

```


C
C
C

PUT EVENT IN EVENT CHAIN

```
CALL EARRAY(IS)
EVLIST(IS,1)= CTIME+ TTIME+PTIME
EVLIST(IS,2)= 1.0
EVLIST(IS,3)= TGT(I,1)
EVLIST(IS,4)= 1.*I
TGT(I,20)= IS*1.
CALL DARRAY(IA)
EVLIST(IS,5)= 1.*IA
EVLIST(IS,6)= CE
EVLIST(IS,7)= CN
EVLIST(IS,8)= 1.*NUNIT
EVLIST(IS,16)= 0.0
EVLIST(IS,17)= 1.0
EVLIST(IS,19)= CTIME
EVLIST(IS,21)= 1.0
EVLIST(IS,36)= TGT(I,3)
EVLIST(IS,37)= TGT(I,4)
EVLIST(IS,41)= CE
EVLIST(IS,42)= CN
EVLIST(IS,43)= ANGLE
CALL DESTGT(IA,I,IS)
```

C
C
C

ENGAGE THE UNIT

```
GDATA(NUNIT,16)= 1.0
GDATA(NUNIT,18)= CTIME
```

C
C
C
5000

SET UP NEXT TARGET EVENT

```
CALL EARRAY(NEXT)
CALL EXPON(TINC)
EVLIST(NEXT,1)=CTIME+ TINC
EVLIST(NEXT,2)= 12.0
TOPT= CTIME+ TINC
```

C
C
C

SET UP DECISION EVENT

```
EVLIST(5,1)= TOPT-1
DO 6850 I=1,50
EVLIST(IROW,I)= 0.0
RETURN
END
```

6850
6000

MD 02740
MD 02750
MD 02760
MD 02770
MD 02780
MD 02790
MD 02800
MD 02810
MD 02820
MD 02830
MD 02840
MD 02850
MD 02860
MD 02870
MD 02880
MD 02890
MD 02900
MD 02910
MD 02920
MD 02930
MD 02940
MD 02950
MD 02960
MD 02970
MD 02980
MD 02990
MD 03000
MD 03010
MD 03020
MD 03030
MD 03040
MD 03050
MD 03060
MD 03070
MD 03080
MD 03090
MD 03100
MD 03110
MD 03120
MD 03130
MD 03140
MD 03150
MD 03160
MD 03170
MD 03180

1101	CALL UGEN(Z1F,Z1R,TDES(IA,N,2))	MD 03670
C	CONTINUE	MD 03680
C	DO ZONE 2	MD 03690
C		MD 03700
1102	DO 1102 N=1,NZN2	MD 03710
C	CALL UGEN(Z2F,Z2R,TDES(IA,(NZN1+N),2))	MD 03720
C	CONTINUE	MD 03730
C	DO ZONE 3	MD 03740
		MD 03750
		MD 03760
		MD 03770
1103	DO 1103 N=1,NZN3	MD 03780
C	CALL UGEN(Z3F,Z3R,TDES(IA,(NZN1+NZN2+N),2))	MD 03790
C	CONTINUE	MD 03800
C	GO TO 6000	MD 03810
100	TARGET IS SIZE CAT II	MD 03820
		MD 03830
	CALL UGEN(PRDATA(3,1,9,1),PRDATA(3,1,9,2),SNO)	MD 03840
	CALL TNGEN(PRDATA(3,1,5,4),SLAT)	MD 03850
	2PRDATA(3,1,5,4),SLAT)	MD 03860
	CALL TNGEN(PRDATA(3,1,6,1),PRDATA(3,1,6,2),PRDATA(3,1,6,3),	MD 03870
	2PRDATA(3,1,6,4),ZONE1)	MD 03880
	CALL TNGEN(PRDATA(3,1,7,1),PRDATA(3,1,7,2),PRDATA(3,1,7,3),	MD 03890
	2PRDATA(3,1,7,4),ZONE2)	MD 03900
	CALL TNGEN(PRDATA(3,1,8,1),PRDATA(3,1,8,2),PRDATA(3,1,8,3),	MD 03910
	2PRDATA(3,1,8,4),ZONE3)	MD 03920
	TGT(I5OK,23)=2.0	MD 03930
	NPERS= SNO	MD 03940
	GO TO 5000	MD 03950
6000	RETURN	MD 03960
	END	MD 03970
		MD 03980
C	SUBROUTINE TOANAL	ME 00010
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	ME 00020
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	ME 00030
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	ME 00040
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	ME 00050
	2XTLETH,STAT(20,4)	ME 00060
C	DIMENSION PROF(3)	ME 00070
	NEV=1	ME 00080
	IQ=0	ME 00090
	IKV=0	ME 00100
C	GET BASIC DATA	ME 00110
C		ME 00120
		ME 00130
		ME 00140

C	ITT=CEVENT(21)	ME	00150
	IUNIT=CEVENT(8)	ME	00160
	ISUN=CEVENT(9)	ME	00170
	INT=CEVENT(4)	ME	00180
	IS=IROW	ME	00190
1000	DO 1000 I=1,3	ME	00200
	PROF(I)=0.0	ME	00210
	DO 1650 J=1,3	ME	00220
	IF(ARDATA(J,7,2).EQ. 1 .AND. RANGE(CEVENT(6),CEVENT(7),J) .LT.	ME	00230
	2RMAX) PROF(J)= 1.0	ME	00240
1650	CONTINUE	ME	00250
	WRITE(6,10402) PROF	ME	00260
C	CHECK TO SEE IF TARGET IS TARGET OF OPPORTUNITY	ME	00270
C		ME	00280
C	IF(ITT .NE. 1) GO TO 6100	ME	00290
C	TARGET IS TARGET OF OPPORTUNITY	ME	00300
C		ME	00310
C	CHECK TO SEE IF ADJUSTMENT WILL BE CONDUCTED	ME	00320
C		ME	00330
C	CALL UNIF(RNNR)	ME	00340
C	IF(RNNR .GE. .3) GO TO 1290	ME	00350
C	WILL FIRE FOR EFFECT IMMEDIATELY	ME	00360
C	COMMIT ALL UNITS	ME	00370
C		ME	00380
C	ICLK=0	ME	00390
C	DO 3150 I=1,3	ME	00400
	IF(PROF(I).EQ. 0) GO TO 3150	ME	00410
	ICLK= ICLK+1	ME	00420
	ARDATA(K,7,2)= 2.0	ME	00430
	ARDATA(K,7,14)= 1.0	ME	00440
	EVLIST(IROW,(37+K))= 1.0	ME	00450
3150	CONTINUE	ME	00460
	IF(ICLK .EQ. 0) GO TO 6000	ME	00470
C	UNITS ARE AVAILABLE AND HAVE BEEN COMMITTED	ME	00480
C		ME	00490
C	CALL STRAT(PROF,1,5)	ME	00500
	EVLIST(IROW,16)= 1.0	ME	00510
C	DETERMINE THE TARGET ANALYSIS TIME	ME	00520
C		ME	00530
C	CALL TNGEN(PRDATA(2,4,4,1),PRDATA(2,4,4,2),PRDATA(2,4,4,3),	ME	00540
	2PRDATA(2,4,4,4),AC)	ME	00550
		ME	00560
		ME	00570
		ME	00580
		ME	00590
		ME	00600
		ME	00610
		ME	00620

C	DETERMINE THE TIME FOR THE FDC TO SELECT MASS POINT	ME	00630
C		ME	00640
C		ME	00650
	CALL TNGEN(PRDATA(2,4,8,1),PRDATA(2,4,8,2),PRDATA(2,4,8,3),	ME	00660
	2PRDATA(2,4,8,4),AMP)	ME	00670
	CALL TNGEN(PRDATA(2,4,9,1),PRDATA(2,4,9,2),PRDATA(2,4,9,3),	ME	00680
	2PRDATA(2,4,9,4),APR)	ME	00690
	EVLIST(IROW,1)= CTIME+AC+AMP+APR	ME	00700
	EVLIST(IROW,2)= 2.	ME	00710
	RETURN	ME	00720
1290	CONTINUE	ME	00730
	TGT(INT,30)= 1.0	ME	00740
C	SEE IF CENTER BATTERY IS AVAILABLE	ME	00750
C		ME	00760
C	IF(PROF(2) .NE. 1) GO TO 1700	ME	00770
100		ME	00780
C	BATTERY IS AVAILABLE	ME	00790
C		ME	00800
C	IBAT=2	ME	00810
	GO TO 2000	ME	00820
C	CENTER BATTERY IS NOT AVAILABLE	ME	00830
C		ME	00840
C	CHECK THE BATTERY ON UNIT SIDE OF THE BATTLE ZONE	ME	00850
C		ME	00860
C		ME	00870
1700	CONTINUE	ME	00880
	IF(IUNIT .GT. 2) ISIDE=3	ME	00890
	IF(IUNIT .GT. 2) IOPP=1	ME	00900
	IF(IUNIT .LE. 2) ISIDE=1	ME	00910
	IF(IUNIT .LE. 2) IOPP=3	ME	00920
	IF(PROF(ISIDE) .NE. 1) GO TO 1710	ME	00930
	IBAT=ISIDE	ME	00940
	GO TO 2000	ME	00950
C	CHECK UNIT ON OPPOSITE SIDE IF NECESSARY	ME	00960
C		ME	00970
C		ME	00980
1710	CONTINUE	ME	00990
	IF(PROF(IOPP) .NE. 1) GO TO 6000	ME	01000
	IBAT=IOPP	ME	01010
C	UNIT "IBAT" IS AVAILABLE AND IN RANGE	ME	01020
C	COMMIT THE ARTILLERY BATTERY FOR THE ADJUSTMENT	ME	01030
C		ME	01040
C	EVLIST(IROW,9)= 1.*IBAT	ME	01050
C	EVLIST(IROW,34)= 1.*IBAT	ME	01060
2000	TGT(INT,28)= 1.*IBAT	ME	01070
	TGT(INT,29)= RANGE(CEVENT(6),CEVENT(7),IBAT)	ME	01080
		ME	01090
		ME	01100

C	COMMIT ALL UNCOMMITTED UNITS IN RANGE	ME	01110
C		ME	01120
C		ME	01130
	DO 2010 K=1,3	ME	01140
	IF (PROF(K) .EQ. 0) GO TO 2010	ME	01150
	ARDATA(K,7,2)=2.0	ME	01160
	ARDATA(K,7,14)=1.0	ME	01170
	EVLIST(IROW,(37+K))= 1.0	ME	01180
2010	CONTINUE	ME	01190
C		ME	01200
C	DETERMINE TARGET ANALYSIS TIME.	ME	01210
C		ME	01220
	CALL TNGEN(PRDATA(2,4,4,1), PRDATA(2,4,4,2), PRDATA(2,4,4,3),	ME	01230
	2PRDATA(2,4,4,4), ANTIME)	ME	01240
C		ME	01250
C	DETERMINE TIME FOR ADJUSTING UNIT TO PREPARE AND FIRE THE INITIAL	ME	01260
C	VOLLEY IN ADJUSTMENT	ME	01270
C		ME	01280
	CALL TNGEN(PRDATA(2,4,5,1), PRDATA(2,4,5,2), PRDATA(2,4,5,3),	ME	01290
	2PRDATA(2,4,5,4), TO)	ME	01300
C		ME	01310
C	SET UP THE ADJUSTMENT SEQUENCE	ME	01320
C		ME	01330
	EVLIST(IROW,1)= CTIME+ANTIME+TO	ME	01340
	EVLIST(IROW,(IBAT+9))= 2.0	ME	01350
	EVLIST(IROW,2)= 2.	ME	01360
	RETURN	ME	01370
C		ME	01380
C	NO UNITS ARE AVAILABLE, SEE IF SUPPORTING UNIT IS AVAILABLE	ME	01390
C		ME	01400
6000	CONTINUE	ME	01410
	IF (SUP(1) .NE. 0) GO TO 1709	ME	01420
	CALL SGAGE	ME	01430
	RETURN	ME	01440
C		ME	01450
C	SUPPORTING UNIT NOT AVAILABLE	ME	01460
C		ME	01470
1709	IQ=1	ME	01480
	CALL QUE(IQ)	ME	01490
	RETURN	ME	01500
C		ME	01510
C	SEE IF TARGET IS PREP TARGET	ME	01520
C		ME	01530
6100	CONTINUE	ME	01540
	IF (ITT .NE. 2) GO TO 8000	ME	01550
C		ME	01560
C	TARGET IS PREP TARGET	ME	01570
C		ME	01580

C	SEE IF TARGET IS IN AREA	ME	01590
C	CALL UNIF(RNNR)	ME	01600
C	IF(RNNR .GT. .3) GO TO 4150	ME	01610
C	TARGET EXISTS	ME	01620
C	CALL DARRAY(I)	ME	01630
C	EVLIST(IROW,5)= 1.*I	ME	01640
	CALL DESTGT(I,INT,IS)	ME	01650
	GO TO 3900	ME	01660
C	TARGET DOES NOT EXIST	ME	01670
C	EVLIST(IROW,5)= 100.	ME	01680
4150	CONTINUE	ME	01690
C	SEE IF SCHEDULED UNIT IS AVAILABLE	ME	01700
C	KSTAT= ARDATA(ISUN,7,2)	ME	01710
C	GO TO (4100,4200,4200),KSTAT	ME	01720
C	UNIT IS AVAILABLE	ME	01730
4100	ARDATA(ISUN,7,2)= 2.0	ME	01740
	ARDATA(ISUN,7,14)= 2.0	ME	01750
	EVLIST(IROW,34)= 1.*ISUN	ME	01760
	EVLIST(IROW,(37+ISUN))= 1.0	ME	01770
	TGT(INT,11)= 1.*ISUN	ME	01780
	TGT(INT,37)= CTIME	ME	01790
	TGT(INT,31)= 1.0	ME	01800
	TGT(INT,32)= 1.0	ME	01810
	IST=2	ME	01820
	CALL STRAT(PROF,ISUN,IST)	ME	01830
	RETURN	ME	01840
C	UNIT IS NOT AVAILABLE, SEE IF ANOTHER IS AVAILABLE	ME	01850
C	ISUN=0	ME	01860
4200	DO 4250 K=1,3	ME	01870
	IF(PROF(K) .NE. 1) GO TO 4250	ME	01880
	ISUN=K	ME	01890
	CONTINUE	ME	01900
	IF(ISUN .NE. 0) GO TO 4100	ME	01910
4250	IQ=2	ME	01920
	IF(SUP(1) .NE. 0) GO TO 4260	ME	01930
	CALL SGAGE	ME	01940
	RETURN	ME	01950
		ME	01960
		ME	01970
		ME	01980
		ME	01990
		ME	02000
		ME	02010
		ME	02020
		ME	02030
		ME	02040
		ME	02050
		ME	02060

4260	CALL QUE(IQ)	ME	02070
	RETURN	ME	02080
C	TARGET IS SCHEDULED	ME	02090
C	SEE IF SCHEDULED UNIT IS AVAILABLE	ME	02100
C		ME	02110
C		ME	02120
8000	CONTINUE	ME	02130
	IF(PROF(ISUN) .NE. 1) GO TO 8011	ME	02140
C	UNIT IS AVAILABLE	ME	02150
C		ME	02160
C	IBAT=ISUN	ME	02170
	GO TO 8050	ME	02180
C	UNIT IS NOT AVAILABLE CHOOSE ONE OF OTHER UNITS	ME	02190
C		ME	02200
C		ME	02210
C		ME	02220
8011	CONTINUE	ME	02230
8010	DO 8060 J=1,3	ME	02240
	IF(PROF(J) .EQ. 1) GO TO 8075	ME	02250
8060	CONTINUE	ME	02260
C		ME	02270
C	NO UNIT AVAILABLE, CHECK SUPPORTING UNIT	ME	02280
C		ME	02290
C	IF(SUP(1) .EQ. 1) GO TO 8401	ME	02300
C	SUPPORTED UNIT IS AVAILABLE	ME	02310
	CALL SGAGE	ME	02320
	RETURN	ME	02330
8075	IBAT=J	ME	02340
C		ME	02350
C	SEE IF SAFE TO FIRE	ME	02360
C		ME	02370
8050	IF(CEVENT(7) .GT. GDATA(IUNIT,13)) GO TO 8097	ME	02380
C		ME	02390
C	TARGET IS UNSAFE	ME	02400
C		ME	02410
	CALL WD400(INT)	ME	02420
	RETURN	ME	02430
	TARGET IS SAFE	ME	02440
C		ME	02450
C	SEE IF THERE IS A TARGET THERE	ME	02460
C		ME	02470
8097	CALL UNIF(RNNR)	ME	02480
	TGT(INT,37)=CTIME	ME	02490
	IF(RNNR .GT. .3) GO TO 8096	ME	02500
C	TARGET EXISTS	ME	02510
C		ME	02520
C		ME	02530
		ME	02540


```

C      CALL DARRAY(I)
C      EVLIST(IROW,5)= 1.*I
C      CALL DESTGT(I,INT,IS)
C      GO TO 8400
C
C      TARGET DOES NOT EXIST
C
C      8096 EVLIST(IROW,5)= 100.
C      8400 IF(IKV .EQ. 0) GO TO 8300
C
C      TARGET GOES TO THE QUE
C
C      8401 IQ=4
C      NEV=1
C      CALL QUE(IQ)
C      RETURN
C
C      8300 ARDATA( IBAT,7,2)= 2.
C      ARDATA( IBAT,7,14)= 4.
C      EVLIST(IROW,(9+IBAT))= 1.0*NGUNS
C      EVLIST(IROW,34)= 1.*IBAT
C      EVLIST(IROW,(37+IBAT))= 1.0
C      IST=4
C      TGT(INT,11)= 1.*IBAT
C      CALL STRAT( PROF, IBAT, IST)
C      RETURN
C      9000 END

```

```

ME 02550
ME 02560
ME 02570
ME 02580
ME 02590
ME 02600
ME 02610
ME 02620
ME 02630
ME 02640
ME 02650
ME 02660
ME 02670
ME 02680
ME 02690
ME 02700
ME 02710
ME 02720
ME 02730
ME 02740
ME 02750
ME 02760
ME 02770
ME 02780
ME 02790
ME 02800

```

```

C      SUBROUTINE ADJUST
C
C      COMMON NU, PRDATA(3,7,20,10), GDATA(7,20), TGT(250,40), IGT, 50, 3),
2 EVLIST(250,50), ARDATA(4,7,16), IROW, TDES(10,300,4), FDI05(4,50,3),
3 CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
C      COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4,20,50), NCHGS, NRINC, XLETH,
2 XTLETH, STAT(20,4)
C      DIMENSION PROF(3)
C
C      IR= EVLIST(IROW,4)
C      DO 100 J=1,3
C      PROF(J)= 0.0
C      IUN= EVLIST(IROW,34)
C      DO 1050 J=1,3
C      IF(RANGE(CEVENT(6), CEVENT(7), J) .LE. RMAX .AND. EVLIST(IROW,
2 (37+J)) .EQ. 1) PROF(J)= 1.0
C      CONTINUE
C      1050 SEE IF ADJUSTMENT WILL CONTINUE
C
C
C

```

```

MF 00010
MF 00020
MF 00030
MF 00040
MF 00050
MF 00060
MF 00070
MF 00080
MF 00090
MF 00100
MF 00110
MF 00120
MF 00130
MF 00140
MF 00150
MF 00160
MF 00170
MF 00180
MF 00190
MF 00200

```


C	IF(EVLIST(IROW,16) .EQ. 1) GO TO 1000	MF	00210
C	ADJUSTMENT CONTINUES	MF	00220
C	TGT(IR,30)= TGT(IR,30)+1	MF	00230
	IF(RANGE(CEVENT(6),CEVENT(7),IUN) .GT. RMAX) GO TO 1199	MF	00240
C	DETERMINE TIME FOR FO TO MAKE ADJUSTMENT CORRECTION AND TRANSMIT	MF	00250
C	TO FDC	MF	00260
C		MF	00270
C		MF	00280
C		MF	00290
C		MF	00300
5100	CONTINUE	MF	00310
	CALL TNGEN(PRDATA(2,4,6,1),PRDATA(2,4,6,2),PRDATA(2,4,6,3),	MF	00320
	2PRDATA(2,4,6,4),AT)	MF	00330
C	DETERMINE TIME FOR FDC TO COMPUTE NEW FIRING DATA AND	MF	00340
C	TRANSMIT TO UNIT	MF	00350
C		MF	00360
C		MF	00370
	CALL TNGEN(PRDATA(2,4,7,1),PRDATA(2,4,7,2),PRDATA(2,4,7,3),	MF	00380
	2PRDATA(2,4,7,4),AC)	MF	00390
C	DETERMINE TIME FOR UNIT TO PREPARE AND FIRE ROUNDS	MF	00400
C		MF	00410
C		MF	00420
	CALL TNGEN(PRDATA(2,4,5,1),PRDATA(2,4,5,2),PRDATA(2,4,5,3),	MF	00430
	2PRDATA(2,4,5,4),AF)	MF	00440
	EVLIST(IROW,1)= EVLIST(IROW,1)+AT+AC+AF	MF	00450
	EVLIST(IROW,2) = 2.	MF	00460
	GO TO 6000	MF	00470
C	ADJUSTMENT IS FINISHED	MF	00480
C		MF	00490
C	CALL STRAT(PROF,1,1)	MF	00500
1000	GO TO 6000	MF	00510
C	FIND ANOTHER UNIT TO CONTINUE THE ADJUSTMENT	MF	00520
C		MF	00530
C		MF	00540
C		MF	00550
C		MF	00560
1199	CONTINUE	MF	00570
1200	IF(CEVENT(6) .GE. GDATA(5,3) .AND. CEVENT(6) .LE. GDATA(5,5))	MF	00580
	2GO TO 1210	MF	00590
	ISIDE=3	MF	00600
	GO TO 1220	MF	00610
1210	ISIDE=1	MF	00620
1220	IF(PROF(ISIDE) .EQ. 1 .AND. ISIDE .NE. IUN) GO TO 1250	MF	00630
	IF(ISIDE .EQ. 1) NSIDE= 3	MF	00640
	IF(ISIDE .EQ. 3) NSIDE= 1	MF	00650
	IF(PROF(NSIDE) .EQ. 1 .AND. NSIDE .NE. IUN)GO TO 1260	MF	00660
C	NO UNIT AVAILABLE	MF	00670
C		MF	00680


```

1699 IF(SUP(1)-EQ. 1) GO TO 1699
1700 CALL SGAGE
      RETURN
      CONTINUE
      DO 1230 J=1,3
      IF(EVLIST(IROW,(37+J))-EQ. 0) GO TO 1230
      EVLIST(IROW,(9+J))= 0.0
      ARDATA(J,7,2)= 1.0
      ARDATA(J,7,14)= 0.0
      CONTINUE
      EVLIST(IROW,34) = 0.0
      IK=1
      NEV=1
      CALL QUE(IK)
      GO TO 6000
      EVLIST(IROW,34)= ISIDE*1.
      EVLIST(IROW,(9+IUN))= 0.0
      EVLIST(IROW,(9+ISIDE))= 2.0
      PROF(IUN)= 0.0
      GO TO 5000
      EVLIST(IROW,34)= NSIDE*1.
      EVLIST(IROW,(9+IUN))= 0.0
      EVLIST(IROW,(9+NSIDE))= 2.0
      PROF(IUN)= 0.0
      EVLIST(IROW,1)= EVLIST(IROW,1)+60.
      GO TO 5100
      RETURN
      END
1230
1250
      C
1260
5000
6000

```

```

MF 00690
MF 00700
MF 00710
MF 00720
MF 00730
MF 00740
MF 00750
MF 00760
MF 00770
MF 00780
MF 00790
MF 00800
MF 00810
MF 00820
MF 00830
MF 00840
MF 00850
MF 00860
MF 00870
MF 00880
MF 00890
MF 00900
MF 00910
MF 00920
MF 00930
MF 00940
MF 00950
MF 00960

```

```

      C
      SUBROUTINE STRAT(PROF, IBAT, ITYPE)
      COMMON NU, PRDATA(3,7,20,10), GDATA(7,20), TGT(250,40), IIGT,
2EVLIST(250,50), ARDATA(4,7,16), IROW, TDES(10,300,4), FDI05(4,50,3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
      COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4,20,50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20,4)
      DIMENSION PROF(3)
      C
      INT= EVLIST(IROW,4)
      NCOL=10
      GO TO (100,200,6000,400,500), ITYPE
      J=IBAT+21
      EVLIST(IROW,J)= 0.0
      EVLIST(IROW,1)= CTIME+60
      EVLIST(IROW,(9+IBAT))= 1.*NGUNS
      EVLIST(IROW,2)= 2.
      GO TO 6000
200

```

```

MF 00970
MF 00980
MF 00990
MF 01000
MF 01010
MF 01020
MF 01030
MF 01040
MF 01050
MF 01060
MF 01070
MF 01080
MF 01090
MF 01100
MF 01110
MF 01120
MF 01130
MF 01140

```


100	CALL EVENT(10,NCOL,NVOL)	MF	01150
	TGT(INT,32)= 1.*NVOL	MF	01160
	DO 110 J=1,3	MF	01170
	IF(PROF(J) .NE. 1) GO TO 110	MF	01180
	EVLIST(IROW,(21+J))= NVOL*1.	MF	01190
	EVLIST(IROW,(9+J))= 1.*NGUNS	MF	01200
	ARDATA(J,7,2)=2.0	MF	01210
	ARDATA(J,7,14)= 1.	MF	01220
110	CONTINUE	MF	01230
	CALL EVENT(11,NCOL,ISTRAT)	MF	01240
	TGT(INT,31)= 1.*ISTRAT	MF	01250
	EVLIST(IROW,25)= ISTRAT*1.	MF	01260
C	DETERMINE TIME FOR FO TO MAKE CORRECTIONS	MF	01270
C		MF	01280
C		MF	01290
	CALL TNGEN(PRDATA(2,4,6,1),PRDATA(2,4,6,2),PRDATA(2,4,6,3),	MF	01300
	2PRDATA(2,4,6,4),AC)	MF	01310
C	DETERMINE TIME FOR FDC TO COMPUTE FIRING DATA AND TRANSMIT TO UNI	MF	01320
C		MF	01330
C		MF	01340
	CALL TNGEN(PRDATA(2,4,8,1),PRDATA(2,4,8,2),PRDATA(2,4,8,3),	MF	01350
	2PRDATA(2,4,8,4),AT)	MF	01360
C	DETERMINE THE TIME FOR UNIT TO PREPARE AND FIRE THE INITIAL VOLLE	MF	01370
C		MF	01380
C		MF	01390
	CALL TNGEN(PRDATA(2,4,9,1),PRDATA(2,4,9,2),PRDATA(2,4,9,3),	MF	01400
	2PRDATA(2,4,9,4),AF)	MF	01410
	EVLIST(IROW,1)= CTIME+AC+AT+AF	MF	01420
	EVLIST(IROW,2)= 2.	MF	01430
	GO TO 6000	MF	01440
400	J= IBAT+21	MF	01450
	CALL EVENT(12,NCOL,NVOL)	MF	01460
	TGT(INT,32)= 1.*NVOL	MF	01470
	EVLIST(IROW,J)= 1.*NVOL	MF	01480
	EVLIST(IROW,(IBAT+9))= 1.*NGUNS	MF	01490
	CALL EVENT(13,NCOL,ISTRAT)	MF	01500
	TGT(INT,31)= 1.*ISTRAT	MF	01510
	EVLIST(IROW,25)= 1.*ISTRAT	MF	01520
	EVLIST(IROW,1)= CTIME+60	MF	01530
	EVLIST(IROW,2)=2.	MF	01540
	GO TO 6000	MF	01550
500	CALL EVENT(10,NCOL,NVOL)	MF	01560
	DO 220 J=1,3	MF	01570
	IF(PROF(J) .NE. 1) GO TO 220	MF	01580
	EVLIST(IROW,(21+J))= NVOL*1.	MF	01590
	EVLIST(IROW,(9+J))= 1.*NGUNS	MF	01600
	ARDATA(J,7,2)= 2.0	MF	01610
	ARDATA(J,7,14)= 1.0	MF	01620

220

6000

SUBROUTINE ENGAGE

U

GET BASIC DATA

ISTRAT= CEVENT(25)

SEE IF MISSION IS COMPLETED

```
DO 100 J=22,24
IF(EVLIST(IROW,J) .NE. 0) GO TO 110
CONTINUE
```

MISSION IS COMPLETE

```
IF(EVLIST(IROW,21) .EQ. 1) GO TO 101
IF(EVLIST(IROW,21) .NE. 1) GO TO 102
```

CALL WD100

CALL WD200

GO 1000

MISSION CONTINUES, GET NEW AIMPOINT

DIEF= PRDATA(3,2,ISTRAT,1)/2

```

DIFN=
PRDATA(3,2,ISTRAT,2)

```

SLB1= CEVENT(32)-DIFFE

SUB2= CEMENT (32)
DB1= CEMENT (33)

DB1 = CEVENT(33) + DIFN

CALL UGEN(SLB1,SLB2,EVLST(IROW,6))

183

C	CALL UGEN(DB1,DB2,EVLIST(IROW,7))	MF	02090
C	PERFORM A RANGE CHECK	MF	02100
C		MF	02110
	ICOUNT=0	MF	02120
	DO 200 I=1,3	MF	02130
	IF(RANGE(EVLIST(IROW,6),EVLIST(IROW,7),I)) .LT. RMAX	MF	02140
	AND. EVLIST(IROW,(37+I)) .EQ. 1) GO TO 300	MF	02150
2	EVLIST(IROW,(9+I))= 0.0	MF	02160
	GO TO 200	MF	02170
	EVLIST(IROW,(9+I))= 1.*NGUNS	MF	02180
300	ICOUNT=ICOUNT+1	MF	02190
	CONTINUE	MF	02200
200	IF(ICOUNT .EQ. 0) GO TO 110	MF	02210
	IF(ISTRAT .EQ. 1) GO TO 500	MF	02220
	AIMPOINT CHANGES	MF	02230
		MF	02240
		MF	02250
		MF	02260
		MF	02270
	DETERMINE THE TIME FOR FDC TO SELECT NEW AIM POINT, COMPUTE FIRING	MF	02280
	DATA AND TRANSMIT FIRE COMMANDS TO FIRE UNITS	MF	02290
	CALL TNGEN(PRDATA(2,4,8,1),PRDATA(2,4,8,2),PRDATA(2,4,8,3),	MF	02300
	2PRDATA(2,4,8,4),AT)	MF	02310
	DETERMINE TIME FOR FIRE UNITS TO PREPARE AND FIRE THE VOLLEY	MF	02320
		MF	02330
	CALL TNGEN(PRDATA(2,4,9,1),PRDATA(2,4,9,2),PRDATA(2,4,9,3),	MF	02340
	2PRDATA(2,4,9,4),AF)	MF	02350
	EVLIST(IROW,1)= CTIME+AT+AF	MF	02360
	EVLIST(IROW,2)= 2.	MF	02370
	GO TO 8000	MF	02380
		MF	02390
	AIMPOINT DOES NOT CHANGE	MF	02400
		MF	02410
	DETERMINE TIME FOR FIRE UNIT TO PREPARE AND FIRE ANOTHER VOLLEY	MF	02420
		MF	02430
	CALL TNGEN(PRDATA(2,4,10,1),PRDATA(2,4,10,2),PRDATA(2,4,10,3),	MF	02440
500	2PRDATA(2,4,10,4),TDIF)	MF	02450
	EVLIST(IROW,1)= CTIME+TDIF	MF	02460
	EVLIST(IROW,2)= 2.	MF	02470
	CONTINUE	MF	02480
8000	RETURN	MF	02490
	CHECK THE QUEUE	MF	02500
		MF	02510
	DO 1100 J=1,4	MF	02520
	IF(Q(J) .EQ. 0) GO TO 1100	MF	02530
		MF	02540
1000		MF	02550
		MF	02560

MF 02570
MF 02580
MF 02590
MF 02600
MF 02610

CALL DQUE(J)
GO TO 6000
CONTINUE
RETURN
END

1100
6000

MF 02620
MF 02630
MF 02640
MF 02650
MF 02660
MF 02670
MF 02680
MF 02690
MF 02700
MF 02710
MF 02720
MF 02730
MF 02740
MF 02750
MF 02760
MF 02770
MF 02780
MF 02790
MF 02800
MF 02810
MF 02820
MF 02830
MF 02840
MF 02850
MF 02860
MF 02870
MF 02880
MF 02890
MF 02900

SUBROUTINE SHOOT

C

COMMON NU, PRDATA(3,7,20,10), GDATA(7,20), TGT(250,40), ITGT,
2EVLIST(250,50), ARDATA(4,7,16), IROW, TDES(10,300,4), FD105(4,50,3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4,20,50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20,4)

C

DIMENSION TOF(3)
INT= EVLIST(IROW,4)
DO 500 I=1,3
TOF(I)= 0.0
DO 100 I=1,3
IF(EVLIST(IROW,(21+I)) .GT. 0) EVLIST(IROW,(21+I))= EVLIST(IROW,
2(21+I))-1

500

RAN= RANGE(CEVENT(6), CEVENT(7), I)
CALL FIPAR(RAN, EVLIST(IROW, (25+I)), EVLIST(IROW, (28+I)), TOF(I))

100

CONTINUE
EVLIST(IROW,1)= CTIME+AMAX1(TOF(1), TOF(2), TOF(3))
EVLIST(IROW,2)= 3.0

300

DO 300 I=1,3
ARDATA(I,7,13)= ARDATA(I,7,13)+ EVLIST(IROW, (9+I))

400

DO 400 I=10,12
EVLIST(IROW,35)= EVLIST(IROW,35)+ EVLIST(IROW, I)

6000
1000

GO TO 6000
DO 1000 I=10,12
TGT(INT,13)= TGT(INT,13)+EVLIST(IROW, I)
RETURN
END

MF 02910
MF 02920
MF 02930
MF 02940
MF 02950
MF 02960
MF 02970
MF 02980
MF 02990
MF 03000

SUBROUTINE FIPAR(RAN, ERROR, DERROR, TOF)

C

COMMON NU, PRDATA(3,7,20,10), GDATA(7,20), TGT(250,40), ITGT,
2EVLIST(250,50), ARDATA(4,7,16), IROW, TDES(10,300,4), FD105(4,50,3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4,20,50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20,4)

C

INDEX= RAN/500

C


```

C      FIND MIN RANGE ERROR VARIATION
C
    SMRE= 500.
    DO 100 I=1,NCHGS
      RER= FD105(I,INDEX,1)+(RAN -INDEX*500)*(FD105(I,(INDEX+1),1)-FD1
205(I,INDEX,1))/500
      IF (RER.GT. SMRE) GO TO 100
      SMRE= RER
      ICHG= I
      CONTINUE
      RERROR= (SMRE/1.414)**2
    100
C      FIND DEF ERROR VARIATION
C
    DER= FD105(ICHG,INDEX,2)+(RAN -INDEX*500)*(FD105(ICHG,(INDEX+1),
22)-FD105(ICHG,INDEX,2))/500
    DERROR= (DER/1.414)**2
C      FIND TOF
C
    TOF= FD105(ICHG,INDEX,3)+(RAN -INDEX*500)*(FD105(ICHG,(INDEX+1),
3)-FD105(ICHG,INDEX,3))/500
    RETURN
    END

```

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```

SUBROUTINE DAMAGE
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
INTEGER HB,HF,H
IF(CEVENT(5) .EQ. 100 ) GO TO 2000
SMBN= 0.0
SMBE= 0.0
INT= EVLIST(IROW,4)
DO 100 I=1,3
  IF (CEVENT(9+I) .EQ. 0) GO TO 100
  NR= CEVENT(9+I)
  ARG= (CEVENT(6)-ARDATA(I,7,7))/(CEVENT(7)-ARDATA(I,7,8))
  GTA= ATAN(ARG)
  TRANGE= RANGE(CEVENT(6),CEVENT(7),I)
  IF(NR.EQ.2) GO TO 150
  IF(NR.EQ.4) GO TO 151
  IF(NR.EQ.6) GO TO 152

```


150	HB=3			MF	03470
	HF=4			MF	03480
	GO TO 210			MF	03490
151	HB=2			MF	03500
	HF=5			MF	03510
	GO TO 210			MF	03520
152	HB=1			MF	03530
	HF=6			MF	03540
210	DO 1700 J=HB, HF			MF	03550
	CALL BPNT(STRANGE, GTA, I, J, BLOCCE, BLOCN)			MF	03560
	IF (NR .NE. 2) GO TO 700			MF	03570
	SMBN= SMBN+BLOCN			MF	03580
	SMBE= SMBE+ BLOCCE			MF	03590
700	HO= CEVENT(5)			MF	03600
	NUM= CEVENT(18)			MF	03610
	DO 3000 H=1, NUM			MF	03620
	IF (TDES(HO, H, 1) .EQ. 0 .AND. TDES(HO, H, 2) .EQ. 0) GO TO 3000			MF	03630
	ENT= DIST(BLOCCE, BLOCN, TDES(HO, H, 1), TDES(HO, H, 2))			MF	03640
	IF (ENT .GT. 250) GO TO 3000			MF	03650
171	PKILL=EXP(-(ENT**2/XLETH**2))			MF	03660
	CALL UNIF(RNNR)			MF	03670
	IF (RNNR .GT. PKILL) GO TO 3000			MF	03680
	EVLIST(IROW, 13)= EVLIST(IROW, 13)+1			MF	03690
	TGT(INT, 14)= TGT(INT, 14)+1			MF	03700
	TDES(HO, H, 1)= 0.0			MF	03710
	TDES(HO, H, 2)= 0.0			MF	03720
3000	CONTINUE			MF	03730
1700	CONTINUE			MF	03740
100	CONTINUE			MF	03750
C				MF	03760
C	HAVE NOW FINISHED ASSESSING THE ROUNDS			MF	03770
C				MF	03780
	IF(EVLIST(IROW, 16) .EQ. 1) GO TO 2000			MF	03790
	SE= SMBE/2			MF	03800
	SN= SMBN/2			MF	03810
	CALL NAIMPT(SE, SN)			MF	03820
	CALL ADJUST			MF	03830
	GO TO 6000			MF	03840
2000	CALL ENGAGE			MF	03850
6000	RETURN			MF	03860
	END			MF	03870
C				MG	00010
	SUBROUTINE BPNT(STRANGE, GTA, I, J, BLOCCE, BLOCN)			MG	00020
	COMMON NU, PRDATA(3, 7, 20, 10), GDATA(7, 20), TGT(250, 40), ITGT, 1			MG	00030
	2EVLIST(250, 50), ARDATA(4, 7, 16), IROW, TDES(10, 300, 4), FD105(4, 50, 3),			MG	00040
	3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN			MG	00050


```

COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C
CALL NGEN(0.0,CEVENT(25+I),ERNG)
CALL NGEN(0.0,CEVENT(28+I),ERDEF)
C
C
C DETERMINE BURST LOCATION IN WEAPON COORDINATE SYSTEM
C
APTE= ARDATA(I,J,3)+TRANGE*SIN(GTA)
APTN= ARDATA(I,J,4)+TRANGE*COS(GTA)
C TRANSFORM COORDINATES TO BASE COORDINATE SYSTEM
C
BLOCN= ERDEF*COS(GTA)+ERNG*SIN(GTA)+APTE
BLOCN= ERNG*COS(GTA)-ERDEF*SIN(GTA)+APTN
RETURN
END
6000

```

```

SUBROUTINE SHIFT(RE,DE,ME,MN)
C
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C REAL ME,MN
C
IF (RE .GT. 800) MN= 1000.
IF (RE .GT. 600 .AND. RE .LE. 800) MN= 800.
IF (RE .GT. 400 .AND. RE .LE. 600) MN= 600.
IF (RE .GT. 200 .AND. RE .LE. 400) MN= 400.
IF (RE .GT. 100 .AND. RE .LE. 200) MN= 200.
IF (RE .GT. 50 .AND. RE .LE. 100) MN= 100.
IF (RE .LE. 50) MN=0.0
I= DE/10
ME= I*10
IF (RE .LT. 50 .AND. DE .LT. 50) GO TO 100
GO TO 6000
100 EVLIST(IROW,16)= 1.0
EVLIST(IROW,32)= CEVENT(6)
EVLIST(IROW,33)= CEVENT(7)
RETURN
END
6000

```


C	SUBROUTINE NAIMPT(SE,SN)	MG	00470
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MG	00480
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),	MG	00490
	3CEVENT(50),J100,J200,CIME,TINC,TOPT,SHOUR,EXMN	MG	00500
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NR INC,XLETH,	MG	00510
	2XTLETH,STAT(20,4)	MG	00520
	REAL ME,MN	MG	00530
	REAL GTA	MG	00540
C	IR= CEVENT(4)	MG	00550
	TLN= TGT(IR,4)	MG	00560
	TLE= TGT(IR,3)	MG	00570
	NUNIT= EVLIST(IROW,8)	MG	00580
C	DETERMINE THE ERROR IN DETERMINING THE APPARANT LOCATION OF THE	MG	00590
C	ROUNDS	MG	00600
C	ARG= (SE-GDATA(NUNIT,12))/(SN-GDATA(NUNIT,13))	MG	00610
	GTA= ATAN(ARG)	MG	00620
	RAN= DIST(TLN,TLE,GDATA(NUNIT,13),GDATA(NUNIT,12))	MG	00630
	VARDEF= PRDATA(2,5,4,1)+RAN*PRDATA(2,5,4,2)	MG	00640
	VARRNG= PRDATA(2,5,5,1)+RAN*PRDATA(2,5,5,2)	MG	00650
	CALL TNGEN(0.0,VARDEF,-PRDATA(2,5,4,4),PRDATA(2,5,4,4),TE)	MG	00660
	CALL TNGEN(0.0,VARRNG,-PRDATA(2,5,5,4),PRDATA(2,5,5,4),TN)	MG	00670
C	TRANSFORM THE COORDINATES	MG	00680
C	ERE= TE*COS(GTA)+TN*SIN(GTA)	MG	00690
	ERN= TN*COS(GTA)-TE*SIN(GTA)	MG	00700
	ABE= SE+ERE	MG	00710
	ABN= SN+ERN	MG	00720
C	DETERMINE TARGET LOCATION IN FO COORDINATE SYSTEM	MG	00730
C	TLIE= TLE-GDATA(NUNIT,12)	MG	00740
	TLIN= TLN-GDATA(NUNIT,13)	MG	00750
	GTA= EVLIST(IROW,43)	MG	00760
	TLEFO= TLIE*COS(GTA)-TLIN*SIN(GTA)	MG	00770
	TLNFO= TLIN*COS(GTA)+TLIE*SIN(GTA)	MG	00780
C	DETERMINE COORDINATES OF APPARANT LOCATION OF BURST IN FO	MG	00790
C	COORDINATE SYSTEM	MG	00800
C	ABIE= ABE-GDATA(NUNIT,12)	MG	00810
	ABIN= ABN-GDATA(NUNIT,13)	MG	00820
	ABEFO= ABIE*COS(GTA)-ABIN*SIN(GTA)	MG	00830
	ABNFO= ABIN*COS(GTA)+ABIE*SIN(GTA)	MG	00840
C		MG	00850
C		MG	00860
C		MG	00870
C		MG	00880
C		MG	00890
C		MG	00900
C		MG	00910
C		MG	00920
C		MG	00930
C		MG	00940


```

C          SUBROUTINE TNGEN(SMN,SVAR,SLFT,SRGHT,SRES)
          COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
          2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
          3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
          COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
          2XTLETH,STAT(20,4)
          CALL NGEN(SMN,SVAR,S)
          IF(S.GE. SLFT .AND. S.LE. SRGHT) GO TO 200
          GO TO 100
          SRES=S
          RETURN
          END
100
200

```

```

MG 01370
MG 01380
MG 01390
MG 01400
MG 01410
MG 01420
MG 01430
MG 01440
MG 01450
MG 01460
MG 01470
MG 01480
MG 01490
MG 01500

```

```

C          SUBROUTINE UNIF (RN)
          COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
          2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
          3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
          COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
          2XTLETH,STAT(20,4)
          REAL GDATA, PRDATA, TGT
          REAL MOD
          MOD=2**31
          NR=129*NU+1
          RN= NR/MOD
          IF (RN.LT.0.0)RN=-RN
          NU=NR
          RETURN
          END
C
MOD=2**31
NR=129*NU+1
RN= NR/MOD
IF (RN.LT.0.0)RN=-RN
NU=NR
RETURN
END

```

```

MG 01510
MG 01520
MG 01530
MG 01540
MG 01550
MG 01560
MG 01570
MG 01580
MG 01590
MG 01600
MG 01610
MG 01620
MG 01630
MG 01640
MG 01650
MG 01660
MG 01670

```

```

C          SUBROUTINE UGEN(SLO,SAP,RESULT)
          COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
          2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
          3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
          COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
          2XTLETH,STAT(20,4)
          REAL GDATA, PRDATA, TGT
          CALL UNIF (RNNR)
          RESULT= SLO+((SAP-SLO)*RNNR)
          RETURN
          END
C

```

```

MG 01680
MG 01690
MG 01700
MG 01710
MG 01720
MG 01730
MG 01740
MG 01750
MG 01760
MG 01770
MG 01780
MG 01790
MG 01800

```


C	SUBROUTINE EVENT (NUNIT,ICOL,IRESLT)	MG	01810
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MG	01820
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),	MG	01830
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MG	01840
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MG	01850
	2XTLETH,STAT(20,4)	MG	01860
	REAL GDATA,PRDATA, TGT	MG	01870
	DIMENSION ARY(8)	MG	01880
C	DO 1700 I=1,8	MG	01890
1700	ARY(I)=0.0	MG	01900
	SUM=0.0	MG	01910
	DO 100 I=1,8	MG	01920
	IF(NUNIT.NE.10) GO TO 90	MG	01930
	SUM=SUM+PRDATA(3,2,10,I)	MG	01940
	ARY(I)=SUM	MG	01950
	GO TO 100	MG	01960
90	CONTINUE	MG	01970
	IF(NUNIT.NE.11) GO TO 91	MG	01980
	SUM=SUM+PRDATA(3,2,9,I)	MG	01990
	ARY(I)=SUM	MG	02000
	GO TO 100	MG	02010
91	CONTINUE	MG	02020
	IF(NUNIT.NE.12) GO TO 92	MG	02030
	SUM=SUM+PRDATA(3,2,12,I)	MG	02040
	ARY(I)=SUM	MG	02050
	GO TO 100	MG	02060
92	CONTINUE	MG	02070
	IF(NUNIT.NE.13) GO TO 93	MG	02080
	SUM=SUM+PRDATA(3,2,14,I)	MG	02090
	ARY(I)=SUM	MG	02100
	GO TO 100	MG	02110
93	CONTINUE	MG	02120
	SUM=SUM+PRDATA(1,NUNIT,ICOL,I)	MG	02130
100	ARY(I)=SUM	MG	02140
	CONTINUE	MG	02150
	CALL UNIF(RNNR)	MG	02160
	IRESLT=0	MG	02170
	IF(RNNR.GE.ARY(1)) GO TO 200	MG	02180
	IRESLT=1	MG	02190
	GO TO 400	MG	02200
200	CONTINUE	MG	02210
	DO 201 I=1,7	MG	02220
	IF(RNNR.GE.ARY(I) .AND. RNNR .LT. ARY(I+1)) GO TO 202	MG	02230
	IF(ARY(I+1).EQ.1) GO TO 202	MG	02240
201	CONTINUE	MG	02250
		MG	02260

MG 02270
MG 02280
MG 02290
MG 02300
MG 02310
MG 02320
MG 02330
MG 02340
MG 02350
MG 02360
MG 02370
MG 02380
MG 02390
MG 02400
MG 02410
MG 02420
MG 02430
MG 02440
MG 02450
MG 02460

```

GO TO 400
IRESLT=I+1
IF(NUNIT.NE. 10) GO TO 600
IN=IRESLT
IRESLT= PRDATA(3,2,11,IN)
RETURN
CONTINUE
IF( NUNIT.NE. 12) GO TO 610
IN=IRESLT
IRESLT= PRDATA(3,2,13,IN)
RETURN
CONTINUE
IF(NUNIT.GT. 7) RETURN
IF(ICOL.NE. 6.AND. ICOL.NE. 7) RETURN
IF(ICOL.EQ. 6) IR=18
IF(ICOL.EQ. 7) IR=19
IN=IRESLT
IRESLT= PRDATA(1,NUNIT,IR,IN)
RETURN
END

```

202
400

600

610

MG 02470
MG 02480
MG 02490
MG 02500
MG 02510
MG 02520
MG 02530
MG 02540
MG 02550
MG 02560
MG 02570
MG 02580
MG 02590
MG 02600
MG 02610
MG 02620
MG 02630
MG 02640
MG 02650
MG 02660
MG 02670

```

SUBROUTINE TNE
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
SMIN=1000000.
DO 1000 I=1,250
IF (EVLIST(I,50).EQ. 0) GO TO 1000
IF (EVLIST(I,1).LT. SMIN) GO TO 1100
CONTINUE
GO TO 1300
SMIN= EVLIST(I,1)
IROW= I
GO TO 1000
DO 1200 J=1,50
CEVENT(J)= EVLIST(IROW,J)
RETURN
END

```

C

C

1000

1100

1300
1200

C	SUBROUTINE SETUP		MG	02680
	COMMON NU, PRDATA(3,7,20,10), GDATA(7,20), TGT(250,40), ITGT,		MG	02690
	2EVLIST(250,50), ARDATA(4,7,16), IROW,IDES(10,300,4), FDI05(4,50,3),		MG	02700
	3CEVENT(50), J100, J200, CTIME, TOPT, SHOUR, EXMN		MG	02710
	COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4,20,50), NCHGS, NRINC, XLETH,		MG	02720
	2XLETH, STAT(20,4)		MG	02730
	DIMENSION CFLL(2)		MG	02740
C	CTIME=0.0		MG	02750
	TINC=0.0		MG	02760
	TOPT=0.0		MG	02770
	ITGT=0		MG	02780
	SHOUR=0.0		MG	02790
	IROW=0		MG	02800
	J100= 1		MG	02810
	J200= 1		MG	02820
	DO 2501 I=1,7		MG	02830
2501	DO 2501 J=1,20		MG	02840
	GDATA(I,J)= 0.0		MG	02850
	DO 1100 I=1,250		MG	02860
1100	DO 1100 J=1,40		MG	02870
	TGT(I,J)= 0.0		MG	02880
	DO 1101 I=1,10		MG	02890
	DO 1101 J=1,300		MG	02900
	DO 1101 K=1,4		MG	02910
1101	TDES(I,J,K)= 0.0		MG	02920
	DO 1102 I=1,50		MG	02930
1102	CEVENT(I)= 0.0		MG	02940
	DO 6310 I=1,250		MG	02950
6310	DO 6310 J=1,50		MG	02960
	EVLIST(I,J)= 0.0		MG	02970
1103	DO 1103 I=1,7		MG	02980
	GDATA(I,2)= 1.0		MG	03000
	DO 1104 I=1,4		MG	03010
	DO 1104 J=1,7		MG	03020
1104	DO 1104 K=1,16		MG	03030
	ARDATA(I,J,K)= 0.0		MG	03040
1201	DO 1201 J=1,10		MG	03050
	SUP(J)= 0.0		MG	03060
	DO 2733 I=1,4		MG	03070
	DO 2733 J=1,20		MG	03080
	DO 2733 K=1,50		MG	03090
2732	Q(I)= 0.0		MG	03100
2733	QUES(I,J,K)= 0.0		MG	03110
	DO 1215 I=1,20		MG	03120
	DO 1215 J=1,4		MG	03130
1215	STAT(I,J)= 0.0		MG	03140
			MG	03150

C
C
C

LOCATE UNITS ON THE FEBA AND DEFINE THE OBJECTIVES

```

DO 999 I=1,2
CALL TNGEN(PRDATA(1,1,2,1),PRDATA(1,1,2,2),PRDATA(1,1,2,3),
2PRDATA(1,1,2,4),CFLL(I))
CONTINUE
CALL TNGEN(PRDATA(1,5,2,1),PRDATA(1,5,2,2),PRDATA(1,5,2,3),
2PRDATA(1,5,2,4),BFL)
CALL TNGEN(PRDATA(1,7,2,1),PRDATA(1,7,2,2),PRDATA(1,7,2,3),
2PRDATA(1,7,2,4),BDFL)
GDATA(7,5)=BDFL
GDATA(4,5)=BDFL
GDATA(1,5)=CFLL(1)
GDATA(3,5)=BFL+CFLL(2)
GDATA(2,5)=BFL
GDATA(5,5)=BFL
GDATA(6,5)=BDFL
GDATA(2,3)=GDATA(1,5)
GDATA(3,3)=BFL
GDATA(4,3)=GDATA(3,5)
GDATA(6,3)=BFL
DO 1105 I=1,4
EVLIST(I,50)=1.0
GDATA(1,1)=1.0
GDATA(2,1)=2.0
GDATA(3,1)=3.0
GDATA(4,1)=4.0
GDATA(5,1)=5.0
GDATA(6,1)=6.0
GDATA(7,1)=7.0

```

1105

C
C
C
C
C

LOCATE OBJECTIVE CENTERS AND FIREPLANNING CENTER

LOCATE OBJECTIVES CENTERS

```

DO 200 I=1,7
GDATA(1,12)=(GDATA(1,3)+GDATA(I,5))/2
GDATA(I,13)=(GDATA(I,4)+GDATA(I,6))/2
CALL TNGEN(PRDATA(1,1,3,1),PRDATA(1,1,3,2),PRDATA(1,1,3,3),
2PRDATA(1,1,3,4),DIS)
GDATA(1,8)=GDATA(I,6))/2+DIS
GDATA(I,19)=GDATA(I,8)
CALL TNGEN(GDATA(I,12),PRDATA(1,1,17,2),GDATA(I,3),
2GDATA(I,5),GDATA(I,7))
CONTINUE

```

200
C
C

DEFINE ATTITUDE AND AXIS LENGTH FOR EACH OBJECTIVE

MG 03160
MG 03170
MG 03180
MG 03190
MG 03200
MG 03210
MG 03220
MG 03230
MG 03240
MG 03250
MG 03260
MG 03270
MG 03280
MG 03290
MG 03300
MG 03310
MG 03320
MG 03330
MG 03340
MG 03350
MG 03360
MG 03370

MG 03390
MG 03400
MG 03410
MG 03420
MG 03430
MG 03440
MG 03450
MG 03460
MG 03470
MG 03480
MG 03490
MG 03500
MG 03510
MG 03520
MG 03530
MG 03540
MG 03550
MG 03560
MG 03570
MG 03580
MG 03590
MG 03600
MG 03610
MG 03620
MG 03630

C	DO 300 I=1,7	MG 03640
	CALL TNGEN(PRDATA(1,I,4,1),PRDATA(1,I,4,2),PRDATA(1,I,4,3),	MG 03650
	2PRDATA(1,I,4,4),GDATA(I,9))	MG 03660
	CALL TNGEN(PRDATA(1,I,5,1),PRDATA(1,I,5,2),PRDATA(1,I,5,3),	MG 03670
	2PRDATA(1,I,5,4),GDATA(I,10))	MG 03680
	CALL UGEN(-.528,.528,GDATA(I,11))	MG 03690
	GO TO 300	MG 03700
302	GDATA(I,11)= ANGLE	MG 03710
300	CONTINUE	MG 03720
C		MG 03730
C	LOCATE BASE LINES FOR UNITS	MG 03740
C		MG 03750
	DO 9500 I=1,7	MG 03760
9500	GDATA(I,17)= GDATA(I,12)	MG 03770
C		MG 03780
C	DO INITIAL FIRE PLANNING	MG 03790
C		MG 03800
	DO 1600 NUNIT= 1,7	MG 03810
1600	CALL FIPLAN (NUNIT)	MG 03820
	CONTINUE	MG 03830
	CALL IALOC	MG 03840
	CALL FIALOC(CTIME)	MG 03850
	CALL START	MG 03860
	CALL IPROUT	MG 03870
	RETURN	MG 03880
	END	MG 03890
		MG 03900
	SUBROUTINE EXPON(RTIME)	MH 00010
C		MH 00020
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MH 00030
	2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),	MH 00040
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MH 00050
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MH 00060
	2XTLETH ,STAT(20,4)	MH 00070
C		MH 00080
	CALL UNIF(RNNR)	MH 00090
	RTIME= -ALOG(RNNR)*EXMN	MH 00100
	RETURN	MH 00110
	END	MH 00120
	SUBROUTINE ROPAR	MH 00130
C		MH 00140
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MH 00150
	2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),	MH 00160
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MH 00170


```

COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C
C
C
ZERO ALL ARRAYS
C
C
C
DO 2500 I=1,3
DO 2500 IA=1,7
DO 2500 IB=1,20
DO 2500 IC=1,10
2500 PRDATA(I,IA,IB,IC)= 0.0
C
C
C
DO 2506 I= 1,4
DO 2506 J=1,50
DO 2506 K= 1,3
2506 FD105(I,J,K)= 0.0
C
C
C
DO 1702 I=1,7
1702 GDATA (I,2)= 1.0
C
C
C
READ IN MANEUVER ELEMENT GEOMETRICAL AND MOVEMENT PARAMETERS
C
C
C
READ(5,100) ((PRDATA(1,1,J,K),K=1,4),J=2,5)
READ(5,100) ((PRDATA(1,5,J,K),K=1,4),J=2,5)
READ(5,100) ((PRDATA(1,7,J,K),K=1,4),J=2,5)
READ(5,100) ((PRDATA(1,1,16,K),K=1,2)
READ(5,100) PRDATA(1,1,17,2),PRDATA(1,5,17,2),PRDATA(1,7,17,2)
C
C
C
READ IN THE FIREPLANNING PARAMETERS
C
C
C
J=1
READ(5,101) (PRDATA(1,J,18,K),K=1,8), (PRDATA(1,J,6,K),K=1,8),
1000 PRDATA(1,J,19,K),K=1,8), (PRDATA(1,J,7,K),K=1,8),
3((PRDATA(1,J,K,L),L=1,8),K=8,15)
IF(J.EQ. 1) IN=5
IF(J.EQ. 5) IN=7
IF(J.EQ. 7) GO TO 1100
J=IN
GO TO 1000
1100 DO 1200 J=2,4
DO 1200 K=2,20
DO 1200 L=1,10
1200 PRDATA(1,J,K,L)= PRDATA(1,1,K,L)
C
C
C
DO 1250 K=2,20
DO 1250 L=1,10
1250 PRDATA(1,6,K,L)=PRDATA(1,5,K,L)
C
C
C
DO 1260 I=2,7
DO 1260 J=1,2
1260 PRDATA(1,I,16,J)= PRDATA(1,1,16,J)
C
C
C
READ IN ARTILLERY PARAMETERS
C
C
C

```


C	READ(5,100) ((PRDATA(2,1,I,J),J=1,4),I=4,15)	MH	00660
	READ(5,100) ((PRDATA(2,4,I,J),J=1,4),I=2,13)	MH	00670
	READ(5,100) ((PRDATA(2,5,I,J),J=1,4),I=2,5)	MH	00680
	DO 1300 I=2,3	MH	00690
	DO 1300 J=4,15	MH	00700
	DO 1300 K=1,10	MH	00710
1300	PRDATA(2,I,J,K)= PRDATA(2,1,J,K)	MH	00720
	READ(5,101) ((PRDATA(3,2,I,J),J=1,8),I=2,14)	MH	00730
C		MH	00740
C	READ IN THE BALLISTIC PARAMETERS	MH	00750
		MH	00760
		MH	00770
	READ(5,102) NCHGS,NRINC	MH	00780
	READ(5,100) RMAX	MH	00790
	DO 1400 I=1,NCHGS	MH	00800
	DO 1400 J=1,3	MH	00810
1400	READ(5,101) (FD105(I,K,J),K=1,NRINC)	MH	00820
	READ(5,102) NU,NGUNS	MH	00830
C		MH	00840
C	READ THE TARGET DESCRIPTION PARAMETERS	MH	00850
		MH	00860
	READ(5,100) PRDATA(3,1,1,1)	MH	00870
	READ(5,100) ((PRDATA(3,1,I,J),J=1,4),I=1,10)	MH	00880
C	READ IN MISCELLANEOUS PARAMETERS	MH	00890
	READ(5,103) EXMN,XLETH	MH	00900
	RETURN	MH	00910
100	FORMAT(4F10.2)	MH	00920
101	FORMAT(8F10.2)	MH	00930
102	FORMAT(2I10)	MH	00940
103	FORMAT(F10.3)	MH	00950
	END	MH	00960
C	SUBROUTINE EARRAY(IOPEN)	MH	00970
		MH	00980
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MH	00990
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MH	01000
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MH	01010
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MH	01020
	2XTLETH,STAT(20,4)	MH	01030
C		MH	01040
	DO 100 I=6,250	MH	01050
	IF (EVLIST(I,50) .EQ. 0) GO TO 200	MH	01060
100	CONTINUE	MH	01070
	CALL TERM(1,1)	MH	01080
	CALL EXIT	MH	01090
200	IOPEN=I	MH	01100
	EVLIST(I,50)= 1.0	MH	01110

RETURN
END

MH 01120
MH 01130

SUBROUTINE HARRAY(IR)

C

THIS SUBROUTINE LOCATES AN EMPTY STORAGE LOCATION IN THE TARGET
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)

C

DO 100 I=1,250
IF (TGT(I,40) .EQ. 0) GO TO 200

100

CONTINUE
CALL TERM(2,1)
CALL EXIT

200

IR=I
TGT(I,40)= 1.0
TGT(I,39)= 1.0
RETURN
END

MH 01140
MH 01150
MH 01160
MH 01170
MH 01180
MH 01190
MH 01200
MH 01210
MH 01220
MH 01230
MH 01240
MH 01250
MH 01260
MH 01270
MH 01280
MH 01290
MH 01300
MH 01310
MH 01320

SUBROUTINE DARRAY(IS)

C

COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)

C

DO 100 I=1,10
IF (IDES(I,300,1) .EQ. 0) GO TO 200

100

CONTINUE
CALL TERM(3,1)
CALL EXIT

200

IS=I
IDES(I,300,1)= 1.0
RETURN
END

MH 01330
MH 01340
MH 01350
MH 01360
MH 01370
MH 01380
MH 01390
MH 01400
MH 01410
MH 01420
MH 01430
MH 01440
MH 01450
MH 01460
MH 01470
MH 01480
MH 01490


```

C
SUBROUTINE IPROUT
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

PRINT PART I
PRINT SECTION I
WRITE(6,100)
WRITE(6,101)
WRITE(6,102) ((PRDATA(1,7,J,K),K=1,4),J=2,5),((PRDATA(1,7,K,J),
2J=1,2),K=16,17)
WRITE(6,103)
WRITE(6,102) ((PRDATA(1,5,J,K),K=1,4),J=2,5),((PRDATA(1,5,K,J),J=
21,2),K=16,17)
WRITE(6,104)
WRITE(6,102) ((PRDATA(1,1,J,K),K=1,4),J=2,5),((PRDATA(1,1,K,J),
2J=1,2),K=16,17)
WRITE(6,110)

PRINT SECTION II
WRITE(6,100)
WRITE(6,105)
WRITE(6,106)
WRITE(6,107) (PRDATA(1,7,18,J),J=1,8), (PRDATA(1,7,6,J),J=1,8),
2((PRDATA(1,7,K,J),J=1,3),K=8,14,2)
WRITE(6,108)
WRITE(6,107) (PRDATA(1,7,19,J),J=1,8), (PRDATA(1,7,7,J),J=1,8),
2((PRDATA(1,7,K,J),J=1,3),K=9,15,2)
WRITE(6,100)
WRITE(6,103)
WRITE(6,106)
WRITE(6,107) (PRDATA(1,5,18,J),J=1,8), (PRDATA(1,5,6,J),J=1,8),
2((PRDATA(1,5,K,J),J=1,3),K=8,14,2)
WRITE(6,108)
WRITE(6,107) (PRDATA(1,5,19,J),J=1,8), (PRDATA(1,5,7,J),J=1,8),
2((PRDATA(1,5,K,J),J=1,3),K=9,15,2)
WRITE(6,100)
WRITE(6,104)
WRITE(6,106)
WRITE(6,107) (PRDATA(1,1,18,J),J=1,8), (PRDATA(1,1,6,J),J=1,8),

```

```

MI 00010
MI 00020
MI 00030
MI 00040
MI 00050
MI 00060
MI 00070
MI 00080
MI 00090
MI 00100
MI 00110
MI 00120
MI 00130
MI 00140
MI 00150
MI 00160
MI 00170
MI 00180
MI 00190
MI 00200
MI 00210
MI 00220
MI 00230
MI 00240
MI 00250
MI 00260
MI 00270
MI 00280
MI 00290
MI 00300
MI 00310
MI 00320
MI 00330
MI 00340
MI 00350
MI 00360
MI 00370
MI 00380
MI 00390
MI 00400
MI 00410
MI 00420
MI 00430
MI 00440
MI 00450
MI 00460

```



```

2((PRDATA(1,1,K,J),J=1,3),K=8,14,2)
  WRITE(6,108)
  WRITE(6,107)
2((PRDATA(1,1,K,J),J=1,3),K=9,15,2)
  WRITE(6,100)
C
C
  PRINT SECTION III
  WRITE(6,111) ((PRDATA(2,1,J,K),K=1,2),J=4,5),((PRDATA(2,1,J,K),K=
21,4),J=6,8), (PRDATA(2,1,9,K),K=1,2)
  DO 36 J=1,6
    L=J+9
    WRITE(6,110) J, (PRDATA(2,1,L,K),K=1,4)
    WRITE(6,111)
    WRITE(6,100)
36
C
C
  PRINT SECTION IV
  WRITE(6,112) ((PRDATA(2,4,J,K),K=1,4),J=2,7)
  WRITE(6,1120) ((PRDATA(2,4,J,K),K=1,4),J=8,9)
  WRITE(6,1121) ((PRDATA(2,4,J,K),K=1,4),J=10,13), ((PRDATA(2,5,J,K)
2,K=1,2),J=2,5)
  WRITE(6,100)
C
C
  PRINT SECTION V
  WRITE(6,113)
  WRITE(6,114)
  WRITE(6,1192) (PRDATA(3,1,10,J),J=1,2), ((PRDATA(3,1,J,K),K=1,2),
2J=2,4), (PRDATA(3,1,K),K=1,2)
  WRITE(6,116)
  WRITE(6,1192) (PRDATA(3,1,9,J),J=1,2), ((PRDATA(3,1,J,K),K=1,2),
2J=6,8), (PRDATA(3,1,5,K),K=1,2)
  WRITE(6,100)
C
C
  PRINT SECTION VI
  WRITE(6,117)
  SUM=0.0
  DO 1200 I=1,8
    SUM=SUM+PRDATA(3,2,9,I)
  WRITE(6,118) I, (PRDATA(3,2,I,J),J=1,2)
  IF(SUM.EQ. 1) GO TO 1201
  CONTINUE
  CONTINUE
  CONTINUE
  WRITE(6,119) (PRDATA(3,2,11,J),J=1,8), (PRDATA(3,2,10,J),J=1,8)
  WRITE(6,120) (PRDATA(3,2,13,J),J=1,8), (PRDATA(3,2,12,J),J=1,8)
  WRITE(6,121)
1200
1201

```


WRITE(6,122)	(PRDATA(3,2,9,J),J=1,8)	MI	00950
WRITE(6,123)		MI	00960
WRITE(6,122)	(PRDATA(3,2,14,J),J=1,8)	MI	00970
WRITE(6,124)		MI	00980
WRITE(6,100)		MI	00990
PRINT SECTION VII		MI	01000
WRITE(6,125)		MI	01010
DO 1210 I=1,NCHGS		MI	01020
WRITE(6,126) I		MI	01030
WRITE(6,127)		MI	01040
DO 1209 J=1,NRINC		MI	01050
ISK=500*J		MI	01060
WRITE(6,128) ISK, (FD105(I,J,K),K=1,3)		MI	01070
WRITE(6,1281)		MI	01080
WRITE(6,100)		MI	01090
CONTINUE		MI	01100
PRINT SECTION VIII		MI	01110
WRITE(6,129)		MI	01120
DO 1300 I=2,40,2		MI	01130
XKL=I*1.		MI	01140
XKI=EXP(-((I*1.)**2/XLETH**2))		MI	01150
WRITE(6,130) XKL,XKI		MI	01160
DO 1301 I=50,300,10		MI	01170
XKL=I*1.		MI	01180
XKI=EXP(-((I*1.)**2/XLETH**2))		MI	01190
WRITE(6,130) XKL,XKI		MI	01200
WRITE(6,131) XLETH		MI	01210
WRITE(6,100)		MI	01220
PRINT PART II		MI	01230
PRINT SECTION I		MI	01240
WRITE(6,132)		MI	01250
IN=7		MI	01260
IM=7		MI	01270
CONTINUE		MI	01280
DO 1400 I=IN,IM		MI	01290
IF(I.LE.4) WRITE(6,135) I		MI	01300
IF(I.EQ.5) OR I.EQ.6) WRITE(6,134) I		MI	01310
IF(I.EQ.7) WRITE(6,133)		MI	01320
WRITE(6,136) (GDATA(I,J),J=3,5,2),(GDATA(I,J),J=7,10),(GDATA(I,J),J=12,13)		MI	01330
2,J=12,13)		MI	01340
WRITE(6,100)		MI	01350
		MI	01360
		MI	01370
		MI	01380
		MI	01390
		MI	01400
		MI	01410
		MI	01420

1400	CONTINUE		MI	01430
	IF(IN .NE. 7) GO TO 1401		MI	01440
	IN=5		MI	01450
	IM=6		MI	01460
1401	GO TO 1399		MI	01470
	IF(IN .NE. 5) GO TO 1402		MI	01480
	IN=1		MI	01490
	IM=4		MI	01500
1402	GO TO 1399		MI	01510
C	CONTINUE		MI	01520
C	PRINT SECTION II		MI	01530
C	WRITE(6,137)		MI	01540
	DO 1500 I=1,3		MI	01550
	WRITE(6,138) I		MI	01560
	IF(ARDATA(I,7,6) .LT. 0) ARDATA(I,7,6)= 6.28-ABS(ARDATA(I,7,6))		MI	01570
	SBAT= 6400.*ARDATA(I,7,6)/(2*3.14)		MI	01580
	WRITE(6,139) (ARDATA(I,7,J),J=3,4), (ARDATA(I,7,J),J=7,10),		MI	01590
2	2SBAT,(J,(ARDATA(I,J,K),K=3,4),J=1,6)		MI	01600
	WRITE(6,100)		MI	01610
	CONTINUE		MI	01620
1500			MI	01630
C			MI	01640
C	PRINT PART III		MI	01650
C	WRITE(6,140)		MI	01660
	K=0		MI	01670
	DO 1600 I=1,ITGT		MI	01680
	IF(TGT(I,7) .EQ. 1 .AND. TGT(I,11) .EQ. 0) GO TO 1600		MI	01690
	WRITE(6,141) K,(TGT(I,J),J=1,2)		MI	01700
	K=K+1		MI	01710
	IF(TGT(I,5) .EQ. 1) WRITE(6,142)		MI	01720
	IF(TGT(I,6) .EQ. 1) WRITE(6,143)		MI	01730
	IF(TGT(I,7) .EQ. 1) WRITE(6,144)		MI	01740
	WRITE(6,145) (TGT(I,J),J=3,4),TGT(I,11)		MI	01750
	IF(TGT(I,6) .EQ. 1) GO TO 1600		MI	01760
	WRITE(6,146) TGT(I,8)		MI	01770
	CONTINUE		MI	01780
1600	WRITE(6,100)		MI	01790
	RETURN		MI	01800
100	FORMAT(1H1)		MI	01810
101	FORMAT(T63,'PART I',//T61,'SECTION I',//T49,'BASIC MANEUVER ELEMENT		MI	01820
	PARAMETERS,////T7,'DESCRIPTION',T35,'TYPE OF DISTRIBUTION',T70,		MI	01830
2	'MEAN',T85,'VARIANCE',T100,'LOWER',T115,'UPPER',T100,'LIMIT',		MI	01840
3	T115,'LIMIT,////T60,'BRIGADE DATA,////)		MI	01850
4	FORMAT(IX,'WIDTH OF FRONT',T37,'TRUNCATED NORMAL',T65,F10.2,		MI	01860
	2T84,F10.2,T98,F10.2,T113,F10.2//IX,'DISTANCE TO OBJECTIVE',T37,		MI	01870
102	3'TRUNCATED NORMAL',T65,F10.2,T98,F10.2,T113,F10.2//		MI	01880
			MI	01890
			MI	01900

51X, 'LENGTH OF OBJ MAJ AXIS', T37, 'TRUNCATED NORMAL', T65, F10.2, 01910
6T84, F10.2, T98, F10.2//1X, 'LENGTH OF OBJ MIN AXIS', 01920
7T37, 'TRUNCATED NORMAL', T65, F10.2, T84, F10.2, T113, F10.2// 01930
8 1X, 'MOVEMENT RATE (KM/HR)', T37, 'UNIFORM', T98, F10.2, T113, 01940
2F10.2//1X, 'LATERAL DISPLACEMENT OF UNIT', T37, 'TRUNCATED NORMAL', 01950
2T65, F10.2, T84, F10.2, T98, 'SEE NOTE//1X, 'OBJECTIVE ABOUT UNIT//1X, 'CM 01960
2ENTER LINE', 01970
FORMAT(T59, 'BATTALION DATA', ///) MI 01980
FORMAT(T60, 'COMPANY DATA', ///) MI 01990
FORMAT(T61, 'SECTION II', ///T54, 'FIREPLANNING PARAMETERS', /// MI 02000
2T60, 'BRIGADE DATA', ///) MI 02010
FORMAT(T56, 'FIREPLANNING STATE 1', T56, '-----'//1X, 02020
FORMAT(1X, 'VALUES FOR NUMBER OF TARGETS UNIT WILL', T80, 8F6.2//1X, MI 02030
2PLAN IN THE FIREPLANNING PROCESS', T80, 8F6.2//1X, 'PROBABILITIES ASSOCIATED TARM 02040
3WITH THE ABOVE VALUES', T80, 8F6.2//1X, 'PROBABILITIES THAT A RANDOM TARM 02050
4GET IS A', T80, 3F6.2//1X, 'PREPARATORY TARGET', 'SCHEDULED TARGET//1X, MI 02060
3OR AN ON CALL TARGET', T80, 3F6.2//1X, 'PROBABILITIES THAT A RANDOM PREPARATORY THMI 02070
4TARGET', T80, 3F6.2//1X, 'IS LOCATED ON THE UNIT OBJECTIVE', T80, 3F6.2//1X, 02080
5E//1X, 'LINE OF DEPARTURE (OR FEBA) AND THE UNIT OBJECTIVE', T80, 3F6.2//1X, 02090
7EYOND, 'THE UNIT OBJECTIVE//1X, 'PROBABILITIES THAT A RANDOM SCHEDULED MI 02100
8, T80, 3F6.2//1X, 'TARGET IS LOCATED ON THE UNIT OBJECTIVE', T80, 3F6.2//1X, 02110
9THE//1X, 'LINE OF DEPARTURE (OR FEBA) AND THE UNIT OBJECTIVE', T80, 3F6.2//1X, 02120
31X, 'PROBABILITIES THAT A RANDOM ON CALL TARGET', T80, 3F6.2//1X, 02130
3IS LOCATED ON THE UNIT OBJECTIVE, T80, 3F6.2//1X, 'LINE OF DEPARTURE MI 02140
4RE (OR FEBA) AND THE UNIT OBJECTIVE', T80, 3F6.2//1X, 'THE UNIT OBJECTIVE MI 02150
5VE', ///) MI 02160
FORMAT(T56, 'FIREPLANNING STATE 2', T56, '-----'//1X, 02170
FORMAT(//10X, 'NOTES', T10X, (1) ALL DISTANCE MEASUREMENTS ARE IN MI 02180
2METERS//10X, (2) BOUNDS ON THE LATERAL DISPLACEMENT OF THE UNIT OBMI 02190
3JECTIVES//14X, 'ARE FUNCTIONS OF THE RESPECTIVE UNIT LEFT AND RIGHT MI 02200
4 BOUNDARIES', SECTION III, T53, 'ARTILLERY UNIT PARAMETERS', ///) MI 02210
2T7, 'DESCRIPTION', T35, 'TYPE OF DISTRIBUTION', T70, 'MEAN', T85, MI 02220
3VARIANCE', T100, 'LOWER', T115, 'UPPER', T100, 'LIMIT', T115, 'LIMIT', MI 02230
41X, 'BATTERY LATERAL DISPLACEMENT', T37, 'TRUNCATED NORMAL', T65, MI 02240
5F10.2, T84, F10.2, T98, 'SEE NOTES//1X, 'ABOUT THE CENTER LINE', T65, MI 02250
6OF THE SUPPORTED UNIT//1X, 'BATTERY DEPTH DISPLACEMENT', T37, MI 02260
6TRUNCATED NORMAL', T65, F10.2, T84, F10.2, T98, 'SEE NOTES', MI 02270
61X, 02280
6BEHIND THE FRONT LINE//1X, 'OF THE SUPPORTED UNIT//1X, 'MARCH ORDER MI 02290
7R TIME (SEC)', T37, 'TRUNCATED NORMAL', T65, F10.2, T84, F10.2, MI 02300
8T98, F10.2, T113, F10.2//1X, 'MOVEMENT RATE (KM/HR)', T37, MI 02310
9TRUNCATED NORMAL', T65, F10.2, T84, F10.2, T98, F10.2, T113, F10.2// MI 02320
21X, 'UNIT EMPLOYMENT TIME (SEC)', T37, 'TRUNCATED NORMAL', T65, F10.2, MI 02330
3T84, F10.2, T98, F10.2, T113, F10.2//1X, 'POSITION ERROR COMPONENT', T37, MI 02340
4TRUNCATED NORMAL', T65, F10.2, T84, F10.2, T98, 'SEE NOTE', /// MI 02350
4T55, 'DISPERSION OF WEAPONS', T55, 'UNIFORM DISTRIBUTIONS', MI 02360
4T10, 'WEAPON', T50, 'DEPTH DISPERSION', T100, 'LATERAL DISPERSION', T40 MI 02370
MI 02380

103
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105
106
107

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111

[illegible]

C	SUBROUTINE RESET(I)	MJ	00010
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MJ	00020
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MJ	00030
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MJ	00040
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MJ	00050
	2XTLETH,STAT(20,4)	MJ	00060
C	GO TO (100,200,300,400,500,600,700),I	MJ	00070
100	J=1	MJ	00080
	K=1	MJ	00090
200	GO TO 1000	MJ	00100
	K=2	MJ	00110
300	J=2	MJ	00120
	GO TO 1000	MJ	00130
	K=3	MJ	00140
400	J=3	MJ	00150
	GO TO 1000	MJ	00160
	K=4	MJ	00170
500	J=4	MJ	00180
	GO TO 1000	MJ	00190
	K=1	MJ	00200
600	J=2	MJ	00210
	GDATA(5,2)= 2.0	MJ	00220
	GO TO 1000	MJ	00230
	K=3	MJ	00240
700	J=4	MJ	00250
	GDATA(6,2)= 2.0	MJ	00260
	GO TO 1000	MJ	00270
	K=1	MJ	00280
1000	J=4	MJ	00290
	GDATA(5,2)= 2.0	MJ	00300
	GDATA(6,2)= 2.0	MJ	00310
	GDATA(7,2)= 2.0	MJ	00320
	DO 1100 N=K,J	MJ	00330
	GDATA(N,15)= 0.0	MJ	00340
	GDATA(N,14)= CTIME	MJ	00350
1100	GDATA(N,2)= 2.0	MJ	00360
	DO 1200 N=1,50	MJ	00370
1200	EVLIST(IROW,N)= 0.0	MJ	00380
	RETURN	MJ	00390
	END	MJ	00400
		MJ	00410
		MJ	00420

C	SUBROUTINE EXTGT		MJ 00430
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,		MJ 00440
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),		MJ 00450
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN		MJ 00460
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,		MJ 00470
	2XTLETH ,STAT(20,4)		MJ 00480
C	DO 100 I=1,250		MJ 00490
	IF(IGT(I,9) .NE. 0) GO TO 100		MJ 00500
	IF(IGT(I,4) .NE. 0 .AND. TGT(I,4) .LT. GDATA(7,13)) CALL WD400(I)		MJ 00510
100	CONTINUE		MJ 00520
	EVLIST(3,1)= CTIME+1200		MJ 00530
	RETURN		MJ 00540
	END		MJ 00560
			MJ 00570
C	SUBROUTINE START		MJ 00580
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,		MJ 00590
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),		MJ 00600
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN		MJ 00610
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,		MJ 00620
	2XTLETH ,STAT(20,4)		MJ 00630
C	EVENT SET UP FOR REOCCURRING EVENTS		MJ 00640
C	SET UP FIRST TARGET OF OPPORTUNITY		MJ 00650
C	CALL EXPON(TOPT)		MJ 00660
C	TINC= TOPT		MJ 00670
C	CALL EARRAY(I)		MJ 00680
	EVLIST(I,1)= TOPT		MJ 00690
	EVLIST(I,2)= 12.		MJ 00700
C	SET UP FIRST MAIN DECISION EVENT		MJ 00710
C	EVLIST(1,1)= 600.		MJ 00720
C	EVLIST(1,2)= 7.		MJ 00730
C	SET UP DECISION EVENT (SPECIAL CYCLE)		MJ 00740
C	EVLIST(4,1)= TOPT-1		MJ 00750
C	EVLIST(4,2)= 7.		MJ 00760
C	SET UP THE ARTILLERY MOVE DECISION		MJ 00770
C	EVLIST(2,1)= 660.		MJ 00780
			MJ 00790
			MJ 00800
			MJ 00810
			MJ 00820
			MJ 00850
			MJ 00860
			MJ 00870
			MJ 00880

Line	Code	Statement	Column
1	C	EVLIST(2,2)= 8.	00890
2	C	SET UP CLEAR UNFIRED TARGETS	00900
3	C		00910
4	C	EVLIST(3,1)= 1800.	00920
5	C	EVLIST(3,2)= 13.	
6	C	SET FLAGS FOR START	00950
7	C		00960
8	C	CALL EARRAY(I)	00970
9	C	EVLIST(I,1)= 0.0	00980
10	C	EVLIST(I,2)= 14.	00990
11	C	EVLIST(I,3)= 7.	01000
12	C		01010
13	C	SET UP THE CONVERSION CYCLE FOR ON CALL TARGETS	01020
14	C		01030
15	C		01040
16	C	CALL EARRAY(I)	01050
17	C	CALL EXPON(VT)	01060
18	C	EVLIST(I,1)= VT	01070
19	C	EVLIST(I,2)= 5.0	01080
20	C		01090
21	C	SET UP THE QUEUE SAMPLING EVENT	01100
22	C		01110
23	C	CALL EARRAY(I)	01120
24	C	EVLIST(I,1)= 10.	01130
25	C	EVLIST(I,2)= 6.0	01140
26	C	RETURN	01150
27	C	END	01160
28	C		
29	C	SUBROUTINE DISGE	01170
30	C	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	01180
31	C	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	01190
32	C	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	01200
33	C	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	01210
34	C	2XTLETH ,STAT(20,4)	01220
35	C		01230
36	C	NUNIT= CEVENT(3)	01240
37	C	IF(NUNIT.EQ.100) GO TO 50	01250
38	C	GDATA(NUNIT,16)= 0.0	01260
39	C	GDATA(NUNIT,18)= 0.0	01270
40	C	GDATA(NUNIT,14)= CTIME	01280
41	C	SUP(1)= 0.0	01290
42	C	DO 100 I= 1,50	01300
43	C	EVLIST(IROW,I)= 0.0	01310
44	C	RETURN	01320
45	C	END	01330
46	C		01340
47	C		
48	C		
49	C		
50	C		
51	C		
52	C		
53	C		
54	C		
55	C		
56	C		
57	C		
58	C		
59	C		
60	C		
61	C		
62	C		
63	C		
64	C		
65	C		
66	C		
67	C		
68	C		
69	C		
70	C		
71	C		
72	C		
73	C		
74	C		
75	C		
76	C		
77	C		
78	C		
79	C		
80	C		
81	C		
82	C		
83	C		
84	C		
85	C		
86	C		
87	C		
88	C		
89	C		
90	C		
91	C		
92	C		
93	C		
94	C		
95	C		
96	C		
97	C		
98	C		
99	C		
100	C		

C	SUBROUTINE WD100		MJ	01350
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),IIGT,		MJ	01360
	2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),		MJ	01370
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN		MJ	01380
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,		MJ	01390
	2XTLETH,STAT(20,4)		MJ	01400
C	IR= CEVENT(4)		MJ	01410
	JR= CEVENT(5)		MJ	01420
	NUNIT= TGT(IR,2)		MJ	01430
	GDATA(NUNIT,16)= 0.0		MJ	01440
	TGT(IR,13)= CEVENT(35)		MJ	01450
	IF (TGT(IR,11) .EQ. 100) GO TO 850		MJ	01460
	TGT(IR,11) = 4.0		MJ	01470
	TGT(IR,14)= CEVENT(13)		MJ	01480
850	DO 700 I=1,3		MJ	01490
	IF(CEVENT(I+37) .EQ. 0) GO TO 700		MJ	01500
	ARDATA(I,7,2)= 1.0		MJ	01510
	ARDATA(I,7,14)= 0.0		MJ	01520
700	CONTINUE		MJ	01530
	IF(TGT(IR,26) .EQ. 0) TGT(IR,33)= 0.0		MJ	01540
	IF(TGT(IR,26) .NE. 0) TGT(IR,33)= TGT(IR,14)/TGT(IR,26)		MJ	01550
	IF(TGT(IR,14) .EQ. 0) TGT(IR,34)= 0.0		MJ	01560
	IF(TGT(IR,14) .NE. 0) TGT(IR,34)= TGT(IR,13)/TGT(IR,14)		MJ	01570
	TGT(IR,35)= CTIME-TGT(IR,10)		MJ	01580
	IF(TGT(IR,35) .EQ. 0) TGT(IR,36)= 0.0		MJ	01590
	IF(TGT(IR,35) .NE. 0) TGT(IR,36)= TGT(IR,14)/TGT(IR,35)		MJ	01600
	GATHER CUMMULATIVE ROUNDS/KILL INFORMATION ON THE		MJ	01610
	TARGETS OF OPPORTUNITY		MJ	01620
C	STAT(10,1)= STAT(10,1)+ TGT(IR,13)		MJ	01630
C	STAT(10,2)= STAT(10,2)+ TGT(IR,14)		MJ	01640
C	STAT(10,3)= STAT(10,3)+1		MJ	01650
C	GATHER CUMMULATIVE KILL RATE INFORMATION		MJ	01660
	STAT(9,1)= STAT(9,1)+ TGT(IR,14)		MJ	01670
	STAT(9,2)= STAT(9,2)+ TGT(IR,35)		MJ	01680
	STAT(9,3)= STAT(9,3)+1		MJ	01690
	DO 600 I=1,50		MJ	01700
	EVLIST(IROW,I)= 0.0		MJ	01710
	WRITE(10,1275) (TGT(IR,IV),IV=1,40)		MJ	01720
600	DO 1700 I=1,40		MJ	01730
			MJ	01740
			MJ	01750
			MJ	01760
			MJ	01770
			MJ	01780
			MJ	01790
			MJ	01800

MJ 01810
MJ 01820
MJ 01830
MJ 01840
MJ 01850
MJ 01860
MJ 01870

1700 TGT(IR,I)= 0.0
DO 800 I= 1,300
DO 800 J=1,2
800 TDES(JR,I,J)= 0.0
RETURN
1275 FORMAT(40F10.2)
END

C SUBROUTINE WD200
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)

C IR= EVLIST(IROW,4)
JR= EVLIST(IROW,5)
TGT(IR,12)= CTIME
DO 700 I=1,3
IF(CEVENT(I+9).EQ. 0) GO TO 700
700 ARDATA(I,7,2)= 1.0
ARDATA(I,7,14)= 0.0
CONTINUE
DO 600 I=1,50
600 EVLIST(IROW,I)= 0.0
WRITE(20,1275) (TGT(IR,IV),IV=1,40)
DO 1700 I=1,40
1700 TGT(IR,I)= 0.0
IF(JR.EQ. 0) RETURN
DO 800 I=1,300
800 TDES(JR,I,J)= 0.0
RETURN
1275 FORMAT(40F10.2)
END

C SUBROUTINE WD300
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C I= EVLIST(IROW,4)


```

      J= EVLIST(IROW,5)
      TGT(I,11)= 100.
      TGT(I,12)= EVLIST(IROW,14)
      TGT(I,10)= EVLIST(IROW,19)
      DO 100 M=1,50
      EVLIST(IROW,M)=0.0
      IF(J.EQ.100) GO TO 250
      DO 200 K=1,300
      DO 200 L=1,2
      TDES(J,K,L)= 0.0
      WRITE(30,1275) (TGT(I,J),J=1,40)
      DO 300 J=1,40
      TGT(I,J)= 0.0
      RETURN
      FORMAT(40F10.2)
      END
100
200
250
300
1275

```

```

      SUBROUTINE WD400(I)
      COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
      2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
      3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
      COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
      2XTLETH ,STAT(20,4)
      IS= TGT(I,20)
      WRITE(40,1275) (TGT(I,IV),IV=1,40)
      ZERO THE ARRAY ROW IN THE TARGET HISTROY ARRAY
      DO 100 J=1,40
      TGT(I,J)= 0.0
      CONTINUE
      ZERO THE EVLIST ENTRIES
      IF(IS.EQ. 0) RETURN
      DO 150 J=1,50
      EVLIST(IS,J)= 0.0
      RETURN
      FORMAT(40F10.2)
      END
100
150
1275

```



```

SUBROUTINE SET(QHOUR, R1, R2)
COMMON NU, PRDATA(3, 7, 20, 10), GDATA(7, 20), TGT(250, 40), ITGT,
2EVLIST(250, 50), ARDATA(4, 7, 16), IROW, IDES(10, 300, 4), FDI05(4, 50, 3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4, 20, 50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20, 4)
CALL EARRAY(IX)
EVLIST(IX, 1) = QHOUR - 900
EVLIST(IX, 2) = 10.
EVLIST(IX, 3) = R1
EVLIST(IX, 4) = QHOUR
CALL EARRAY(IY)
EVLIST(IY, 1) = QHOUR
EVLIST(IY, 2) = 14.
EVLIST(IY, 3) = R2
RETURN
END

```

MJ 02660
MJ 02670
MJ 02680
MJ 02690
MJ 02700
MJ 02710
MJ 02720
MJ 02730
MJ 02740
MJ 02750
MJ 02760
MJ 02770
MJ 02780
MJ 02790
MJ 02800
MJ 02810
MJ 02820
MJ 02830
MJ 02840

```

SUBROUTINE SUMRY
COMMON NU, PRDATA(3, 7, 20, 10), GDATA(7, 20), TGT(250, 40), ITGT,
2EVLIST(250, 50), ARDATA(4, 7, 16), IROW, IDES(10, 300, 4), FDI05(4, 50, 3),
3CEVENT(50), J100, J200, CTIME, TINC, TOPT, SHOUR, EXMN
COMMON SUP(10), RMAX, NGUNS, Q(4), QUES(4, 20, 50), NCHGS, NRINC, XLETH,
2XTLETH, STAT(20, 4)
DIMENSION ROW(40), LINE(40), EVTR(50)

```

MK 00010
MK 00020
MK 00030
MK 00040
MK 00050
MK 00060
MK 00070
MK 00080
MK 00090
MK 00100
MK 00110
MK 00120
MK 00130
MK 00140
MK 00150
MK 00160
MK 00170
MK 00180
MK 00190
MK 00200
MK 00210
MK 00220
MK 00230
MK 00240
MK 00250
MK 00260
MK 00270

```

REWIND 10
REWIND 20
REWIND 25
REWIND 30
REWIND 40
IF(SUP(3) .EQ. 0) WRITE(6, 10)
PRINT SECTION I
WRITE(6, 100)
DO 110 I=1, 1000
READ(25, 1600, END=1000) (EVTR(J), J=1, 50)
WRITE(6, 1613) (EVTR(J), J=1, 50)
DO 110 K=12, 1000, 12
IF(I .EQ. K) WRITE(6, 69)
CONTINUE

```

```

PRINT SECTION II

```

110
C
C


```

C 1000      WRITE(6,200)
            DO 220 I=1,1000
            DO 205 LT=1,1000,2
            IF(I.EQ. LT) WRITE(6,95)
            CONTINUE
205      READ(10,201,END=1100) (EVTR(J),J=1,40)
            WRITE(6,500) EVTR(1), (EVTR(K),K=3,4), (EVTR(K),K=21,27), EVTR(10),
            2EVTR(2), (EVTR(K),K=28,32), (EVTR(K),K=13,14), (EVTR(K),K=33,36)
            DO 220 L=2,1000,2
            IF(I.EQ. L) WRITE(6,69)
            CONTINUE
220      PRINT SECTION III
C
C
C 1100      WRITE(6,305)
            DO 300 I=1,1000
            DO 296 L=1,1000,4
            IF(I.EQ. L) WRITE(6,96)
            CONTINUE
296      READ(20,201,END=1200) (EVTR(J),J=1,40)
            WRITE(6,600) EVTR(1), EVTR(5), EVTR(7), EVTR(2), EVTR(8), EVTR(37),
            2EVTR(11), (EVTR(K),K=31,32), EVTR(13), EVTR(26), EVTR(14)
            DO 300 K=4,1000,4
            IF(I.EQ. K) WRITE(6,69)
            CONTINUE
300      PRINT SECTION IV
C
C
C 1200      WRITE(6,401)
            DO 400 I=1,1000
            DO 360 L=1,1000,5
            IF(I.EQ. L) WRITE(6,96)
            CONTINUE
360      READ(30,201,END=1300) (EVTR(J),J=1,40)
            WRITE(6,700) EVTR(1), EVTR(5), EVTR(7), EVTR(9), EVTR(11), EVTR(10),
            2EVTR(37), EVTR(35)
            DO 400 L=5,1000,5
            IF(I.EQ. L) WRITE(6,69)
            CONTINUE
400      PRINT SECTION V
C
C
C 1300      WRITE(6,800)
            DO 820 I=1,10
            EVTR(I)=0.0
            IF(STAT(I,2).EQ. 0) GO TO 820
            EVTR(I)= STAT(I,1)/STAT(I,2)

```

```

MK 00280
MK 00290
MK 00300
MK 00310
MK 00320
MK 00330
MK 00340
MK 00350
MK 00360
MK 00370
MK 00380
MK 00390
MK 00400
MK 00410
MK 00420
MK 00430
MK 00440
MK 00450
MK 00460
MK 00470
MK 00480
MK 00490
MK 00500
MK 00510
MK 00520
MK 00530
MK 00540
MK 00550
MK 00560
MK 00570
MK 00580
MK 00590
MK 00600
MK 00610
MK 00620
MK 00630
MK 00640
MK 00650
MK 00660
MK 00670
MK 00680
MK 00690
MK 00700
MK 00710
MK 00720
MK 00730
MK 00740
MK 00750

```



```

3F10.6,2X,'ROUNDS / CASUALTY'/2X,'TARGET OF OPPORTUNITY'///)
END
REAL FUNCTION DIST(A,B,C,D)
C
DIST= SQRT((A-C)**2+(B-D)**2)
RETURN
END
REAL FUNCTION RANGE(ET,SN,I)
C
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)
C
RANGE= SQRT((ET-ARDATA(I,7,7))**2+ (SN-ARDATA(I,7,8))**2)
RETURN
END

SUBROUTINE WEVENT
C
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)
C
WRITE(25,1275) (EVLIST(IROW,J),J=1,50)
FORMAT(50F10.2)
RETURN
END
1275

SUBROUTINE FIOBJ(NUNIT,KRES)
C
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRING,XLETH,
2XTLETH,STAT(20,4)
C
KRES=0
GO TO(100,100,100,100,200,200,1000),NUNIT
IF(NUNIT.LE.2) J=5
IF(NUNIT.GT.2) J=6
IF(GDATA(NUNIT,20).EQ.1 .AND. GDATA(J,20).EQ.1) KRES=1
GO TO 1000
100

```


200	IF(GDATA(NUNIT,20) .EQ. 1) KPES=1	MK	01680
1000	RETURN	MK	01690
	END	MK	01700
C	SUBROUTINE QUE(I)	MK	01710
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MK	01720
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MK	01730
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MK	01740
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MK	01750
	2XTLETH,STAT(20,4)	MK	01760
	DIMENSION PROF(3)	MK	01770
C	Q(I)= Q(I)+1	MK	01780
	DO 1000 J=1,20	MK	01790
	IF(QUES(I,J,50) .NE. 0) GO TO 1000	MK	01800
	IJ=J	MK	01810
	QUES(I,J,50)= 1.0	MK	01820
	GO TO 1200	MK	01830
	CONTINUE	MK	01840
1000		MK	01850
C	NO ROOM IN THE QUEUE	MK	01860
C	CALL TERM(4,I)	MK	01870
C	STOP	MK	01880
	DO 1250 J=1,50	MK	01890
1200	QUES(I,IJ,J)= EVLIST(IROW,J)	MK	01900
1250	EVLIST(IROW,J)= 0.0	MK	01910
	RETURN	MK	01920
	END	MK	01930
		MK	01940
		MK	01950
		MK	01960
C	SUBROUTINE DQUE(J)	MK	01970
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	MK	01980
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	MK	01990
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	MK	02000
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	MK	02010
	2XTLETH,STAT(20,4)	MK	02020
	DIMENSION PROF(3)	MK	02030
C	TMIN= 10.**6.	MK	02040
	DO 100 K= 1,20	MK	02050
	IF(QUES(J,K,1) .GT. TMIN) GO TO 100	MK	02060
	IF(QUES(J,K,50) .EQ. 0) GO TO 100	MK	02070
	TMIN= QUES(J,K,1)	MK	02080
	IS=K	MK	02090
		MK	02100
		MK	02110

100
MK 02120
MK 02130
MK 02140
MK 02150
MK 02160
MK 02170
MK 02180
MK 02190
MK 02200
MK 02210
MK 02220
MK 02230
MK 02240

```

CONTINUE
STAT(J+4,1)= STAT(J+4,1) + CTIME - QUES(J,IS,1)
STAT(J+4,2)= STAT(J+4,2)+1
CALL EARRAY(IX)
DO 200 I=1,50
  EVLIST(IX,I)= QUES(J,IS,I)
  QUES(J,IS,I)= 0.0
CONTINUE
EVLIST(IX,1)= CTIME+120
EVLIST(IX,2)= 1.
Q(J)= Q(J)-1
RETURN
END

```

200

02250
MK 02260
MK 02270
MK 02280
MK 02290
MK 02300
MK 02310
MK 02320
MK 02330
MK 02340
MK 02350
MK 02360
MK 02370
MK 02380
MK 02390
MK 02400
MK 02410
MK 02420

```

SUBROUTINE CKQUE
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
DO 100 J=1,4
  IF(Q(J).EQ. 0) GO TO 100
  GO TO 200
CONTINUE
GO TO 1000
CALL DQUE(J)
DO 1100 J=1,50
  EVLIST(IROW,J)= 0.0
RETURN
END

```

C

C

100
200
1000
1100

00010
ML 00020
ML 00030
ML 00040
ML 00050
ML 00060
ML 00070
ML 00080
ML 00090
ML 00100
ML 00110
ML 00120
ML 00130

```

SUBROUTINE SGAGE
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
INT= EVLIST(IROW,4)
TGT(INT,37)= CTIME
ENGAGE THE SUPPORTING UNIT

```

C

C

C

C

C	SUP(1)= 1.0	ML	00140
C	DETERMINE HOW LONG THE ENGAGEMENT WILL BE	ML	00150
C		ML	00160
	IF(EVLIST(IROW,21) .EQ. 1) IS=11	ML	00170
	IF(EVLIST(IROW,21) .EQ. 4) IS=12	ML	00180
	IF(EVLIST(IROW,21) .EQ. 2) IS=13	ML	00190
	CALL TNGEN(PRDATA(2,4,IS,1),PRDATA(2,4,IS,2),PRDATA(2,4,IS,3),	ML	00200
	2PRDATA(2,4,IS,4),STIME)	ML	00210
	TGT(INT,35)= STIME	ML	00220
C		ML	00230
C	SET UP THE DISENGAGEMENT	ML	00240
C		ML	00250
	CALL EARRAY(IX)	ML	00260
	EVLIST(IX,1)= CTIME+STIME	ML	00270
	EVLIST(IX,2)= 15.	ML	00280
	IF(EVLIST(IROW,21) .GT. 1) EVLIST(IX,3)= 100.	ML	00290
	IF(EVLIST(IROW,21) .EQ. 1) EVLIST(IX,3)= EVLIST(IROW,8)	ML	00300
	EVLIST(IROW,14)= CTIME+STIME	ML	00310
	CALL WD300	ML	00320
C		ML	00330
C	SET UP EVENT TO SEARCH THE QUEUES WHEN MISSION TERMINATED	ML	00340
C		ML	00350
	CALL EARRAY(IX)	ML	00360
	EVLIST(IX,1)= CTIME+STIME+60.	ML	00370
	EVLIST(IX,2)= 4.0	ML	00380
	RETURN	ML	00390
	END	ML	00400
		ML	00410
		ML	00420
C	SUBROUTINE CONV	ML	00430
	COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,	ML	00440
	2EVLIST(250,50),ARDATA(4,7,16),IROW,IDES(10,300,4),FD105(4,50,3),	ML	00450
	3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN	ML	00460
	COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,	ML	00470
	2XTLETH ,STAT(20,4)	ML	00480
C		ML	00490
	K=0	ML	00500
	DO 100 I=1,250	ML	00510
	IF(TGT(I,6) .EQ. 0) GO TO 100	ML	00520
	IF((TGT(I,4)-GDATA(7,13)) .GT. 1000) GO TO 100	ML	00530
	IF(TGT(I,4) .LT. GDATA(7,13)) GO TO 100	ML	00540
	K=K+1	ML	00550
	CONTINUE	ML	00560
	IF(K .EQ. 0) GO TO 5000	ML	00570
	CALL UGEN(1.0,1.*K,S)	ML	00580
	IT=S	ML	00590
100			


```

200 K=0
C DO 200 I=1,250
C IF(TGT(I,6).EQ.0) GO TO 200
C IF((TGT(I,4)-GDATA(7,13)).GT. 1000) GO TO 200
C K=K+1
C IF(K.EQ. IT) GO TO 300
C CONTINUE
C
C TARGET HAS BEEN IDENTIFIED
C
C 300 IST=I
C
C SEE IF TARGET WILL BE CLASSIFIED AS TARGET OF OPPORTUNITY
C OR A SCHEDULED TARGET
C
C IF(TGT(IST,2).GT. 4) GO TO 1000
C CALL UNIF(RNNR)
C IF(RNNR.GE. .5) GO TO 1000
C
C TARGET BECOMES A TARGET OF OPPORTUNITY
C
C TGT(IST,6)=0.0
C TGT(IST,7)=1.0
C TGT(IST,9)=1.0
C CALL EARRAY(IX)
C EVLIST(IX,1)=CTIME+10.
C EVLIST(IX,2)=1.0
C EVLIST(IX,3)=TGT(IST,1)
C EVLIST(IX,4)=1.*IST
C TGT(IST,10)=CTIME
C TGT(IST,20)=IX*1.
C CALL DARRAY(IA)
C EVLIST(IX,5)=1.*IA
C EVLIST(IX,6)=TGT(IST,3)
C EVLIST(IX,7)=TGT(IST,4)
C IF(TGT(IST,2).GT. 4) GO TO 600
C EVLIST(IX,8)=TGT(IST,2)
C CONTINUE
C DO 1100 I=1,4
C IF(TGT(IST,3).GE. GDATA(I,3).AND. TGT(IST,3).LE. GDATA(I,5))
C 2NUNIT=I
C CONTINUE
C EVLIST(IX,8)=1.*NUNIT
C CONTINUE
C TGT(IST,2)=1.*NUNIT
C EVLIST(IX,17)=1.0
C EVLIST(IX,19)=CTIME
C EVLIST(IX,21)=1.0
600
1100
1101

```



```

C
SUBROUTINE ASTAT
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IRGW,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C
DO 100 J=1,4
STAT(J,1)=STAT(J,1)+Q(J)
STAT(J,2)=STAT(J,2)+1
EVLIST(IROW,1)=CTIME+10.
RETURN
END
100

```

```

ML 01500
ML 01510
ML 01520
ML 01530
ML 01540
ML 01550
ML 01560
ML 01570
ML 01580
ML 01590
ML 01600
ML 01610
ML 01620
ML 01630

```

```

C
SUBROUTINE TERM(I,K)
COMMON NU,PRDATA(3,7,20,10),GDATA(7,20),TGT(250,40),ITGT,
2EVLIST(250,50),ARDATA(4,7,16),IRGW,TDES(10,300,4),FDI05(4,50,3),
3CEVENT(50),J100,J200,CTIME,TINC,TOPT,SHOUR,EXMN
COMMON SUP(10),RMAX,NGUNS,Q(4),QUES(4,20,50),NCHGS,NRINC,XLETH,
2XTLETH,STAT(20,4)
C
SUP(3)=1.0
WRITE(6,99)
GO TO (100,200,300,500),I
100 WRITE(6,101)
GO TO 400
200 WRITE(6,202)
GO TO 400
300 WRITE(6,303)
GO TO 400
500 WRITE(6,404) K
400 WRITE(6,405)
CALL SUMRY
RETURN
99 FORMAT(2X,'FINAL OBJECTIVE NOT SECURED')
101 FORMAT(2X,'EVLIST IN OVERFLOW CONDITION')
202 FORMAT(2X,'TARGET HISTORY ARRAY IN OVERFLOW CONDITION')
303 FORMAT(2X,'TARGET DESCRIPTION ARRAY IN OVERFLOW CONDITION')
404 FORMAT(2X,'QUEUE',2X,I1,1X,'IS IN OVERFLOW CONDITION')
405 FORMAT(////)
END

```

```

ML 01640
ML 01650
ML 01660
ML 01670
ML 01680
ML 01690
ML 01700
ML 01710
ML 01720
ML 01730
ML 01740
ML 01750
ML 01760
ML 01770
ML 01780
ML 01790
ML 01800
ML 01810
ML 01820
ML 01830
ML 01840
ML 01850
ML 01860
ML 01870
ML 01880
ML 01890
ML 01900
ML 01910

```

JOB CONTROL SECTION

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29 December 1970

Major Lowell L. Martin (71193), US Army
HHC 4th Infantry Division (VAJZAA)
APO, San Francisco 96262

Dear Major Martin:

In a review of your thesis, it was discovered that either page 224 is missing or page 225 and on through page 230 are misnumbered. Your advisor, Professor Taylor, tells me that the master copy reflects the same condition and that he is unable to reconcile.

Since it is very likely that you do not have a copy of your thesis with you at your present duty station, I am enclosing a copy of pages 223 and 225. All material from page 226 on consists of references, distribution list, etc., and does not, therefore, bear on the question. Can you, from the enclosures, enlighten me?

Sincerely

George R. Lockett
Professor of Library Science
and Librarian

Soc. Sec. No:

225-52-3159

NO REPLY RECEIVED
AS OF Sept 10, 1971

G.R. Lockett


```

//GO.FT06F001 DD SPACE=(CYL,20)
//GO.SYSUDUMP DD SYSOUT=A,SPACE=(CYL,(8,1))
//GO.FT10F001 DD UNIT=SYSDA,DISP=(NEW,DELETE),DSN=&TEMP1,
// SPACE=(CYL,5),DCB=(RECFM=FB,LRECL=400,BLKSIZE=4000)
//GO.FT20F001 DD UNIT=SYSDA,DISP=(NEW,DELETE),DSN=&TEMP2,
// SPACE=(CYL,5),DCB=(RECFM=FB,LRECL=400,BLKSIZE=4000)
//GO.FT25F001 DD UNIT=SYSDA,DISP=(NEW,DELETE),DSN=&TEMP3,
// SPACE=(CYL,10),DCB=(RECFM=FB,LRECL=500,BLKSIZE=2500)
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//GO.SYSIN DD

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UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

ORIGINATING ACTIVITY (Corporate author)

Naval Postgraduate School
Monterey, California 93940

2a. REPORT SECURITY CLASSIFICATION

Unclassified

2b. GROUP

REPORT TITLE

A Computer Simulation for the Evaluation
of Artillery Direct Fire Support System

DESCRIPTIVE NOTES (Type of report and, inclusive dates)

Master's Thesis; September 1970

AUTHOR(S) (First name, middle initial, last name)

Lowell Lee Martin

REPORT DATE

September 1970

7a. TOTAL NO. OF PAGES

230

7b. NO. OF REFS

7

CONTRACT OR GRANT NO.

9a. ORIGINATOR'S REPORT NUMBER(S)

PROJECT NO.

9b. OTHER REPORT NO(S) (Any other numbers that may be assigned
this report)

DISTRIBUTION STATEMENT

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ABSTRACT

A probabilistic event store computer simulation of the artillery direct fire support system at brigade level is presented. The purpose of the model is to serve as a tool in evaluating changes in artillery fire support system effectiveness as system and battlefield parameters are varied. Parameters which are variable in the model pertain to the geometric configuration of the battlefield, artillery weapon employment configurations, artillery weapon ballistic parameters, weapon lethality, target configuration and vulnerability, artillery system time parameters, weapon position accuracy parameters, and target location accuracy parameters. A description of the model and a FORTRAN IV program listing are provided.

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Artillery simulation						

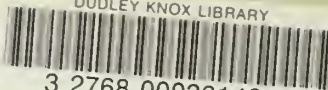
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